The Builder.

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Proposal for a County Hall and Bridge over the River Thames.....By Mr. Ernest W. Twining.
Church of St. Thomas, Southwick, Wilts
Church of St. Stephen, Kingston Lacy, Dorset } .....Mr. C. E. Ponting, F.S.A., Architect.
South Transept, Canterbury Cathedral.....Drawn by Mr. J. W. Hepburn.

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A Byzantine Monastery in Cyprus.

THE Byzantine style of architecture has been familiarised to the European mind through countless travels in the Levant, with pictures, photographs, etc., of buildings in which the dome and the flat terrace roof are the chief and most prominent characteristics. The high gabled roofs and timber construction of the mountain districts of Turkey have hardly attracted much attention—in consequence, perhaps, of their remoteness from the routes usually traversed by travellers. But at the present day the means of communication in the Levant are becoming daily more extensive, and the whole country in a few years will be as well-known as Central Europe. In this hitherto little known quarter of the earth many local peculiarities of building construction—perhaps we may say architecture, although the efforts at artistic expression are of the poorest—are awaiting discovery, and will at least prove of interest to the student of historical development in building.

Cyprus has been occupied, in the course of past ages, by many widely different races, and their presence is marked by remarkable monuments. Such of these monuments as are near the seashore or stand upon the flat lowlands of the island have received a large amount of study and attention from visitors, but in addition to these well-known remains of classic and mediæval times there are also monuments of the Byzantine Church which seem comparatively unknown. Of these the most important are the monasteries of the south-western range of mountains called the Troodos. Amongst the pine and walnut woods of the higher mountains, in secluded valleys where the hordes of the Moslem invasion in 1570 hardly penetrated perhaps, these venerable little strongholds of the Orthodox Church still flourish as the centres of the ecclesiastical life of the island. Within their walls the episcopal succession from ancient times has been continued, and, thanks to their comparatively inaccessible positions, they have formed sanctuaries of refuge from Turkish tyranny, and the perhaps scarcely less detested impositions of the European feudal law of an earlier period. These little mountain convents are hardly to be ranked as architectural or artistic monuments of a very high class. They represent the Orthodox version of those monastic institutions which are a principal feature of the Middle Ages. They have been built by villagers of a very primitive type, living in communities which until a few years back were unaffected by any modern ideas—communities almost unchanged since long before the Middle Ages. The mountain ranges of Cyprus, rising in places to a height of over 6,000 ft., were almost a *terra incognita* until the advent of the English in 1878. Von Loher's "Cyprus," published in 1876, contains a description of probably the first attempt to explore the heights of Troodos. Von Loher made the ascent at a time of year when the upper levels were deep in snow, and his difficulties were augmented by the fear of the mountain spirits on the part of his guides, who had apparently never scaled the mountain before. At the time of Von Loher's visit no efficient map of the island was in existence. Nowadays the mountain districts have been made accessible by many good carriage roads, and the annual summer encampment of the English civil and military officials near the summit of Troodos during the last quarter of a century has completely revolutionised the whole district.

Trooditissa, or the Virgin of Troodos, is a small and characteristic monastery situated on the upper slopes of the principal mountain of the south-western range, at an elevation of 4,675 ft. above the sea. According to legends it was founded about 1200 A.D. in obedience to a divine command; it is curious that this date should synchronise with the advent of King Richard of England in the island and the commencement of the Latin rule.

Like most monastic buildings in mountainous countries—whether in Cyprus or elsewhere—the Trooditissa may be said to "nestle" in a cleft of the upper mountain range, from which it takes its name. Embosomed in a forest growth of pines, walnuts, and cypress, it appears at a distance like the fascinating detail of some background of a picture by Mantegna or Giorgione. Its red-brown tile roofs and simple outlines seem truly mediæval, an illusion which is not

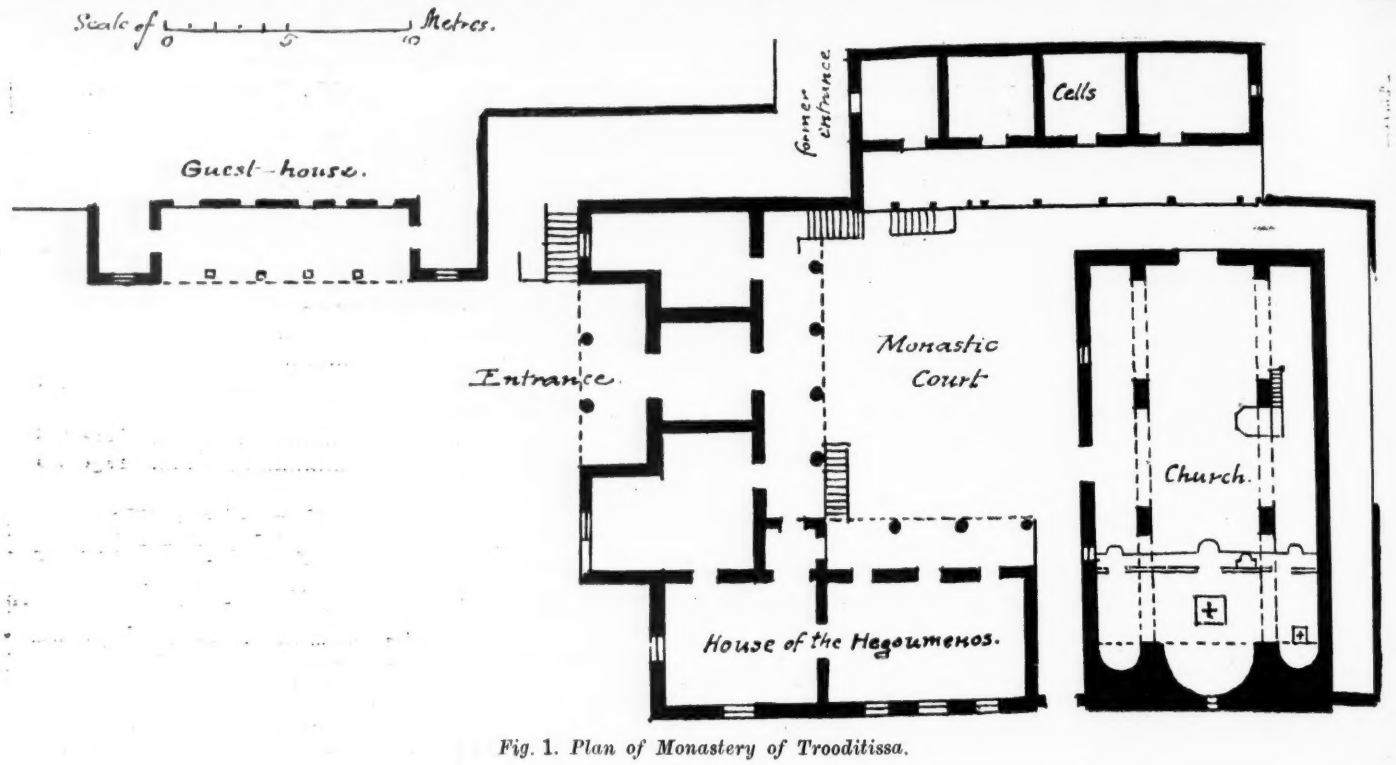


Fig. 1. Plan of Monastery of Trooditissa.

dispelled by a nearer approach or by the absence of any modern roadway leading within its precincts.

The ecclesiastical architecture of Cyprus varies in a most remarkable way in different parts of the island, in spite of the rigid uniformity of plan and arrangement imposed by the customs and ritual of the Orthodox Church. In the Troodos region the winter snow and torrential rains of springtime render it necessary to provide a totally different method of construction in place of the massive stone-vaulted structures of the sea-level. The difficulty of obtaining lime within the district, and the abundant supply of wood, have together contributed, as in Switzerland, to an essentially timber style of building.

At a distance this little monastery presents the appearance of a central European building of the Middle Ages—within its precincts the visitor also finds it difficult to realise that from the peak above it the dim outline of the Syrian mountains may be descried on a very fine day. Only the figures of Orthodox priests, with their cylindrical head-gear, serve to remind him of his Oriental surroundings.

The plan of the monastery (Fig. 1) shows the general arrangement to be a church of three aisles ending in apses, on the south of which extends a courtyard surrounded by the monastic buildings. On the east side of the courtyard is the house of the *hegoumenos* or abbot, the other buildings are occupied by the monks, who at the present time number about ten. On the west side of the monastic court is the main entrance under a loggia, above which is a picturesque gallery in timber framing filled in with boarding.

Owing to the buildings standing on the edge of a sharp declivity, hemmed in on the other side by an equally precipitous slope upwards, they have been extended along the ledge on which they stand in a southerly direction. Outside the monastic court stand the guest-house and a long range of stabling and farm the plan. The guest-house is the only portion of the buildings which has been somewhat "restored" in recent years. In this house the monks have offered hospitality in past times, and it may be that as at present this hospitality has taken the form of a summer residence for the better class of traders and their families from Limassol. Sir Samuel Baker stayed here in 1879, and probably wrote the greater part of his interesting book on Cyprus during his stay.*

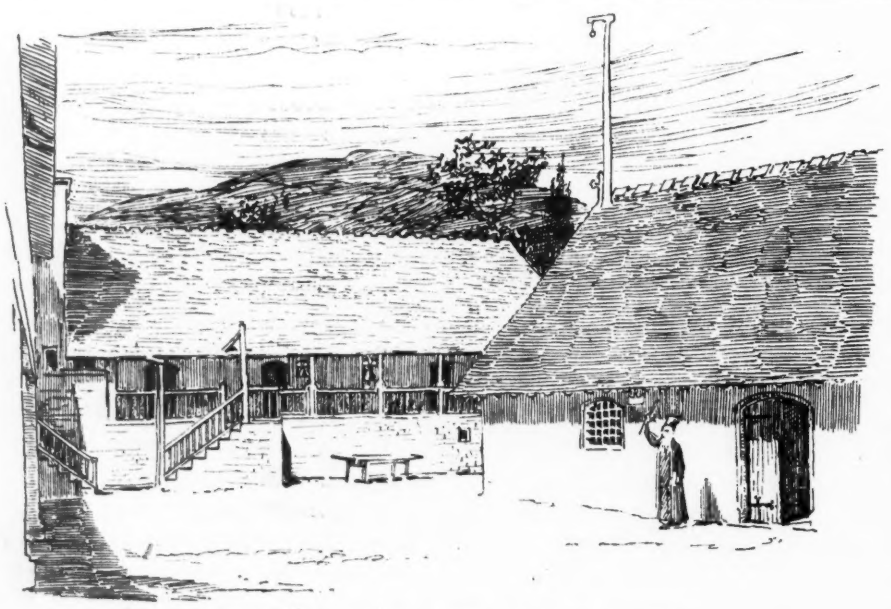


Fig. 2. View in Courtyard, Monastery of Trooditissa.

The picturesque interior of the monastic court (Fig. 2), with its wooden cloister supported on a low-story of cellarage and store-rooms, gives an impression of homely snugness which is perhaps more domestic than monastic in character. The chambers occupied by the monks are simple and rustic, compared with the monumental architecture of a convent in Europe. In addition to the cells of the monks, a room is set apart as a dining buildings, which are not represented in chamber or refectory, but little provision is made for any recreation-room or library. The abbot has a house consisting of two or three rooms apportioned to his particular use. The entrance into the courtyard is covered with a portico of curiously-designed columns in the capitals of which a kind of ring has been formed for the suspension of curtains. (Fig. 4.)

The church of the monastery is a most typical example of such buildings. It appears to date in its present form from at least the beginning of the XVIIIth century, but in all probability it is very much older. Like most buildings of the mediæval Byzantine style it is quite without any dates or inscriptions—an almost totally effaced tablet over the west door is the only trace of such a record. In 1736 the roof was evidently covered with the present tiling. (See inscription on tile, Fig. 3.)

In plan the church follows the invariable arrangements of the orthodox ritual. As is usual, there is but one altar for the Eucharist, on the north side of which is the small altar-table of the Prothesis, or preparation of the bread and wine. The sanctuary, or "Bema,"

* "Cyprus as I Saw It in 1879." 8vo. Lon., '79.

is screened from the congregation in the nave of the church by the iconostasis or solid screen of carved and gilded woodwork covered with the small square panels or icons, none of which rise to a very high level of art. On the north side of the screen is a wonder-working *icon* of the Virgin encased in silver and covered with curtains; this, however, is comparatively modern and very poor in style. In the centre of the nave is a pulpit.

The most remarkable feature about the construction of all the buildings of the monastery is the carpentry of the roofs. In this there seems to be a strange survival of a primitive mode of construction, but little removed from the setting up of tent-poles—and yet many of the roofs of churches in this district of Troodos appear to have endured for centuries.

The view of the east end of the church (Fig. 3) explains the system adopted. There is nothing in the shape of a truss or of framing about these roofs. The external rafters carrying the tiles are placed on a heavy ridge piece and on a wall-plate—these points of support are about 2 mètres or 6 ft. 6 in. apart. The ridge piece is carried on a series of principal rafters (about 6 in. by 4 in.) pitched against each other at an angle of 45 deg. The feet of these rafters are merely notched on to a wall-plate, which is rendered sufficiently strong to resist their thrust by the top of the wall being strengthened in the following manner. When the side walls of the church or building are ready to receive the roof, two wall-plates (about 4 in. by 2 in.) are placed, one on the inside line the other on the outside of each wall. On these a series of tie-beams (about 12 in. square in thickness) is arranged at about an interspacing of 6 ft. On the top of these tie-beams another couple of wall-plates are placed immediately over those beneath. The tie-beams are notched to receive the four wall-plates on each wall, and the space within the wall-plates and tie-beams is then packed up with masonry set in gypsum. On the upper (inner) wall-plate the feet of the principal rafters are then notched. This description can be easily followed in the sketch of the gable, upper portion.

The object in view in this remarkable system of construction is evidently merely

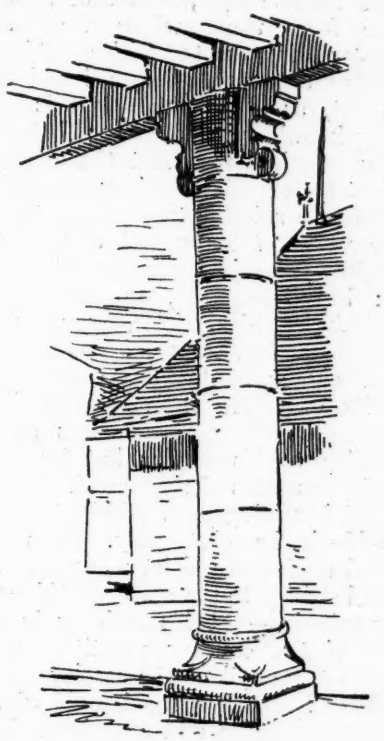


Fig. 4. *Column, Trooditissa.*

to render the top of the walls as rigid as the ground on which the tent poles of a primitive cabin or "wigwam" would stand. The result resembles European buildings, but when investigated the principle of the construction will be found widely different. The only advance upon the rudimentary mode of setting up a cabin with tent-poles is the raising of the points of support to a considerable height above the ground level. A certain similarity between this Cypriote method and the "Fork" or "Cruck" system of Northern Europe seems to exist—they are evidently in either case the earliest forms of building in their respective countries; but the ancient barns of Europe, which still survive from the "Fork" period, are, as a rule, always constructed with the "Crucks" standing directly on the ground.

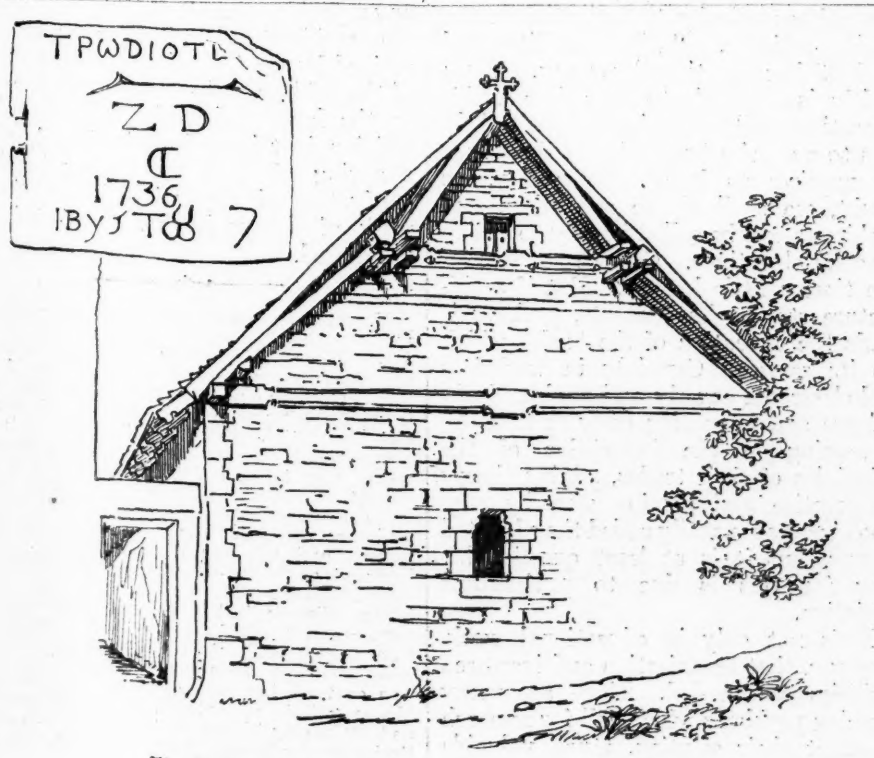


Fig. 3. *East Gable of Church, Monastery of Trooditissa.*

The timber used in these Byzantine buildings is the common Caramanian pine of the shores of Asia Minor (*Pinus halepensis*). It has always been split, not sawn, and then roughly shaped with the adze. Innumerable young trees have been sacrificed for such buildings, only the tie-beams have been formed out of larger trunks.

Internally, both churches and domestic buildings are furnished with thin boarded ceilings, decorated with small mouldings nailed on in panellings and patterns, a style of decoration which has often a very satisfactory effect.

THE ISOLATION OF OUR ART.

(FROM A CORRESPONDENT.)

IN this age of rapid advancement, when new paths are daily opening themselves to mankind, when new knowledge, pouring in upon us like a flood, rushes down the avenues of life carrying each man into a different channel, few dare to linger or to probe the byways, few stay to consider the sources whence the flood comes; and in the infection of this hurry many set sail before they have yet learnt to steer, forgetting that the attainment of the goal is not for him who rapidly embarks, but for the man who first has well considered the voyage and the help he may make use of on the way.

It is, then, not amiss at times to stand aside and act the onlooker, to gather up the sources of our knowledge, examining each spring which feeds the river of our choice, and get assurance that its waters still flow on, lest haply they become diverted and our waterway run dry. No mere passive retrospect, however, made mellow by the mist of years must content our gaze. An active probing is necessary into the work and progress not only of our own art but into those also of our allies—allies who, appreciated and encouraged, will give us of their best; but who, slighted by indifference, will turn their attention to fields of better welcome. And perhaps nothing is more worthy of such a diagnosis than Architecture, because no art has the same power of materially impressing itself upon mankind with the stamp of individuality. A great legal conception may outlive a generation, a great advance in surgery may bring fame for a decade, a new discovery in science may produce a name honoured by posterity, but none can claim the tangibility of a building exposed to the gaze of all men.

It would seem, then, a common duty to a great art to insure that everything, not only in art itself but in all modern progress, should be searched for its advancement, and such things as are found useful servants trained by wise hands and laid under contribution for its furtherance.

Some would say that the public care little for architecture, and that no

encouragement exists for the great efforts demanded by a great conception; but surely such an attitude is an unworthy one? Does the man of science wait for the plaudits of the crowd before he undertakes his abstruse and laborious researches? He works because he loves his subject; because he would probe the laws of Nature, or from a desire to train others to follow up his work and thus ensure a continual advancement. But art, we say, is not science. Art is inborn; the true artist leaps fairy-like into existence; to educate him in his art would be to fetter him and to crush his individuality. How far is this view a sound one? If genius is not always "an infinite capacity for taking pains," at least an analysis of the careers of many among the most able artists will show that their attainments were much more the result of long and laborious study than of inherent capacity. Does the painter who puts the fire of life into a figure, or the sculptor who, unaided by the use of colour, makes his group redolent with vitality, feel crippled by a knowledge of anatomy; or, to come nearer home, did the great architects of the past barter their individuality by acquiring the rules of proportion laid down by Renaissance masters? Surely it is by a system of education, broad and well organised and obligatory upon all called to so conspicuous a career, that the advancement and true appreciation of architecture can be best attained.

But the system must be comprehensive; it must embrace everything which can contribute to a successful building. Architecture is an art, and no one who appreciates his calling would deny the crowning glory to the conception of a great design; but the profession of an architect calls for a wide and growing field of subservient knowledge, without which the finest design may fail as an achievement possessing practical utility.

Business capacity, powers of administration, legal acumen, and scientific knowledge pure and applied all come within the scope of an architect's work; and as a kind Providence has cast men's minds in many different moulds, so some men in the ranks develop best in one direction, some in another. It is not given to every man to plan the marble courts of kings, yet he may serve his art in spheres more humble but no less essential than in carrying out the highest artistic conceptions; hence it would seem but reasonable that the educational facilities at his disposal should recognise these more humble spheres. It is no doubt the extraordinary range of knowledge called for in this profession which causes so much difference of opinion as to its educational demands, but no controversy exists as to the need for further facilities and organisation. Many of us say, "Let us leave matters outside design to experts—the scientist, the civil engineer, the lawyer, the surveyor. We cannot be all these things, which are mere excrescences on our real work." This attitude has some justification, but the justification is limited. An architect is indued with great powers, and therefore has great responsibilities, and while no one would expect him to be an expert upon all the details involved in the construction of a complex modern building, still he is the final court of appeal on all these questions, and is often called upon to make thereon grave decisions. Further, in small works, expert knowledge obtained from outside may be inadmissible, and in the absence of such general knowledge the architect must be placed in the humiliating position of seeking advice from those whose work and estimates he is about to criticise. It is not suggested that an experienced architect does not, as a rule, possess this subsidiary knowledge alluded to; but how has he acquired it? Not through any efficient system of education; not easily, thanks to a suitable trend given to the latter years of his school and college life while yet enjoying a general education; but haphazard, as chance has willed during his articles, or, we fear, too often at the expense of first clients.

The old apprenticeship system has had its day. No individual architect can give the best of all sides of his profession to his pupils; but for some conspicuous cases of time much devoted to careful training we should be tempted to add—if he gives any. Does the medical student—and let us confine the parallel strictly to the mundane things of the profession—get his training in the house of the country practitioner, or even as the pupil of the Harley Street physician? He has the benefit of the highest knowledge and experience from individuals in each of the many branches of his work. His education is systematised, co-ordinated and preconceived as a whole. If he wishes to develop along certain lines after having proved his claim to his profession on general grounds, fields are open to him.

Where are our schools special to Gothic or Renaissance architecture? Does a single class for planning exist in this country? Where is our professor of the law of contracts, of municipal regulations? Where our facilities for the study of materials? To be weeded out piecemeal from some existing two-years' course on "architecture," from the study of existing buildings good and bad, from dead works on law, from elaborate researches made by the scientist or the civil engineer. "The architectural student has no time," we say. True; and he is not likely to have time for his education until something is done to help him to a concise knowledge of the things he requires to know. Some day, no doubt, we shall all be specialists, and architects will be called in only to design graceful elevations. Can we not put off the time a little longer? But if architecture starves its students, perhaps it leads the education of the trades which do its service. Certainly in workshop and classroom eagerly and unobtrusively a large and increasing body of men are advancing in the knowledge of the principles of their trades, adding theory to practice and gaining step by step upon what are usually called the educated classes, but it is at least questionable how far this is due to professional initiative.

It is not only in educational work, however, that organisation and increased facilities are needed. There are many pressing problems which call for research to effect their solution, much valuable information which needs to be arranged to render it accessible, many current professional topics which require an easier channel through which to find the busy man in practice. But do not let us ask for impossibilities. It would be absurd to suggest that the profession should undertake the whole field of work under review, but it is a very different thing to hold the reins and influence the labours of others by displaying an organised interest in matters pertaining to these responsibilities. That scientific investigations, and that questions relating to legal practice and other subjects, are admitted as parts of architecture we have grateful cause to remember in considering the honorary work done in these matters by our parent institution; but how do we stand as compared with other countries? In science, for example, we see Germany actively engaged upon most valuable work on clays and cements; in France a society exists solely for the study of mortar and of certain metals in all their constructional bearings; in America an almost complete investigation upon all the building stones of the United States has been undertaken. But architecture in this country is, alas, a poor profession! No funds exist for such investigations, or how gladly should we initiate such valuable work!

In 1904 a Committee was appointed by the Marquess of Londonderry to consider the founding of a great Imperial Technical College in which all kinds of applied researches and higher training should be conducted, not only in matters connected with engineering but with other technical subjects which could show justification for recognition. A very extensive site has been promised (subject to formal arrangements). The cost, upkeep, and an income of at least 40,000*l.* a year, apart from students' fees, is assured. The college is to be known as the English Charlottenburg, from its intended resemblance to an institution near Berlin, one of the two parent bodies of which was an architectural society. The Committee's final report was published early last year; but architecture has allowed the deliberations to close without any representation on the governing body. No architectural witnesses were examined by the Committee, and a perusal of the evidence taken shows no reference to the large and useful field of study which might have been instituted, with a saving of time and money for the cultivation of the main—the artistic—work of the profession. Art is indeed unfettered.

HOSPITAL ADDITION, REDRUTH.—Lady Clifden recently opened the newly-added operating theatre at the Miners' Hospital, Redruth. The building contains operating theatre 23 ft. by 16 ft., 17 ft. high. Opening out of the room on the one side is the sterilising room and on the other the room for anæsthetics. From the latter there is a communication to the medical officer's department. The internal finish of the walls is of cement, coated with white Parapan paint. The floors are of marble, and all the angles of floors and walls are rounded. The lighting is by a roof lantern and windows all facing north. The heating is on the low-pressure system of hot water with radiators. The ventilation is by special inlets. Electric light is used and gas for special purposes. In addition to the theatre bathrooms have been provided in the hospital and nurses' room, and two outside iron fire escape staircases. The contract has been carried out by Messrs. Hodge & Opie, of Redruth, the plumbing work and fittings by Messrs. Wilton, of Redruth, and the heating by Messrs. Alger, of Newport. Mr. S. Hill was the architect of the work.

NOTES.

In Committee of Supply. THE House in Committee of Supply last Monday dealt with several little points connected with building, old and new; the proceedings gaining a little more piquancy than usual from the vein of humour possessed by the present able First Commissioner of Works. A Scotch member, with whom we cannot but sympathise in a measure (not on Scotch but on architectural grounds), wanted to know whether, "with his Majesty's approval," the paint could not be removed from the stonework of Buckingham Palace; "the stone had been quarried near Edinburgh, and nothing was more offensive to a Scotsman than to see it covered with six or seven coats of paint." It does not seem to have occurred to the member for Central Edinburgh that painting stonework might be offensive for general reasons and not merely as an injury to Scottish susceptibilities. The First Commissioner explained that the stone had been painted because it would not stand the London climate; adding, however, as a salve for the hon. member's feelings, that "he had no doubt that was the fault of the climate and not of the stone." But it is evident that if we employ building materials from Scotland, we have got to treat them with respect in this country, at the risk of Parliamentary denunciation from outraged Scotch members. There seems to be a troubling of the waters among the economists on the ground of the two official residences which are to be formed in Sir Aston Webb's building at the east end of the Mall, and the First Commissioner endeavoured (apparently not quite with success) to get his critics to understand that the expenditure of 80,000*l.* was not on "two official residences" as such, but on a piece of monumental architecture in connexion with the Queen Victoria Memorial, portions of which were to be utilised as residences; which is a very different matter. We are glad to gather that the scheme for rebuilding Holyrood Chapel is stated to have lapsed. One is also glad to learn that "a wicked Radical Government" is not going to do away with the arched bridge between the Home Office and the new Government offices, which was one of the best features in Brydon's design; but after the episode of the confiscated cupola the First Commissioner can hardly be surprised if there are dark suspicions abroad. The question of the position for Watts's group, "Physical Energy," also came up, and the First Commissioner was perfectly right in his conclusion that the proposal to place it on the sham bridge at the end of the Serpentine was absurd, as it would be totally out of scale with that delusive structure. A position near the foot of the glade leading up from the Serpentine to the round pond was suggested. As a matter of effect, it would be a fine position for a sculpture group; but as a matter of sentiment in regard to this particular work, the site seems not sufficiently suggestive or central. The group should be placed somewhere where it would preach daily to the ruling classes the necessity of the culture of physical energy, if this country is to hold its own in the world.

The Proposal for a Building Court. WE feel some doubt whether the proposal of a Building Court for London, ably advocated by Mr. J. W. Simpson the other day in a letter to the *Times*, would be so easily established or conducted as some people seem to suppose, or would bring all the benefits expected in its train. The work would be enormous, far more than could be efficiently carried on by such a Court as proposed, and we doubt if eminent professional men will be willing to accept small fees to sit on the Court, in respect of "the honour of the position." One advantage which would undoubtedly accrue from its establishment would be the doing away, as Mr. Simpson says, with the irritating and inconvenient practice of getting "injunctions" during the progress of a building, and fixing the legal rights of the building-owner beforehand. A possible advantage might be the sanctioning of new buildings in accordance with a definite scheme for London improvement; but the County Council, if they gave their mind and efforts to it, could do this with their present machinery and powers; their fault is that they do so little towards attempting it. The idea suggested by Mr. Simpson should, however, be kept in mind and further considered. It might prove a great good, but it is not quite so simple a problem as it appears to some of those who have been discussing it. Possibly Mr. Delissa Joseph's proposal to give some further powers to the Tribunal of Appeal would meet the case, and would at least be easier of practical realisation.

Hotel Architecture. MR. HAMP'S paper on Hotels, at the Institute of Architects, gave a great deal of detailed information and suggestion, and he showed us a great number of plans of hotels; but neither in the paper nor in the plans exhibited did we find any central and leading idea as to what principle of arrangement should govern hotel-planning. In some of the plans, it might be said that an undue space was given to large halls for spaciousness of internal effect. There seems to be no certain standard as to the proportion to be observed between such show spaces, as they may be called, and the practical requirements of comfort and convenience in living-rooms and bedrooms. Hotels have tended, in fact, to become too palatial; the taste of the age and the standard of hotel-living among the rich seems to demand this; but it may very well be questioned whether it is not desirable to render them a little more homelike, not only in arrangement but in architectural expression. As a general rule, the architecture of the modern large hotel is of the worst class, uniting the pretentious and the commonplace. Mr. Hamp did, in one sentence, recommend simplicity of treatment externally; but we should have liked to have had this point a little more emphasised, and an attack made upon the prevalent characteristics of hotel architecture as (with a few exceptions) it exists at present. Another point that seems to require more attention is the placing and concentration of lavatories and their accessories. In most of the plans shown these seemed to be got in where they could be. To our thinking, in a large hotel to accommodate hundreds of visitors, lavatories (unless where in connexion with private suites) should be grouped together, and cut off from the main building in a systematically planned manner. When the paper and some of the plans appear, as no doubt they will in the Institute Journal, they will be useful and suggestive for study; but we hardly think the heart of the problem has been got at yet.

Pumping Operations and Underground Water. THE case of English *v.* Metropolitan Water Board is one of considerable interest in view of the number of pumping-stations now being erected throughout the country. The defendants had sunk a well and a bore-hole on land acquired by them for the erection of a pumping-station. The well was 110 ft. in depth, but from the top downwards it was lined with steel cylinders to a depth of 76 ft. The bore-hole was 250 ft. in depth, and was connected with the well at a depth of 101 ft. It was lined with steel tubing extending down 91 ft. A stream ran through the defendants' land and bounded the plaintiff's land, which adjoined. The pumping operations caused the water in the stream to subside, and the plaintiff, who used the stream for breeding trout, brought his action against the Water Board. A serious diminution in the water in the stream from the pumping operations was admitted, and it was also found by the judge that there was nothing in the statutory powers possessed by the defendants which would affect the common law rights of the plaintiff to bring an action for nuisance should such a right of action exist. The Lord Chief Justice found as a fact that no water from the stream got into or was pumped from the defendants' well, but that the effect of the pumping operations was to lower the subsoil water underneath and at the sides of the stream which caused the water in the stream to subside, but that no action would lie for this withdrawal of support. This decision is of great importance, for since pumping-stations have been established it has been found that all old-established wells have gone dry over a very extensive area in the neighbourhood of such stations. In Kent this has been especially the case, and considerable inconvenience and loss has in consequence been experienced by private individuals, and where the companies have not laid mains the inhabitants are absolutely deprived of water, and, as the present case shows, they are left without any remedy. It is well known that no rights exist over subterranean water running in undefined channels, and the recent case of Salt Union, Ltd., *v.* Brunner, Mond, & Co., Ltd. (see our Note, the *Builder*, August 25, 1906) was decided on this principle. The abstraction of subterranean water as a support where the loss of water can be traced to this specific cause raises an entirely new question, and the case may possibly be carried to a higher tribunal. In the case of Fletcher *v.* Mayor of

Birkenhead (see our Notes, the *Builder*, December 30, 1905; December 29, 1906) the court of first instance intimated that where by pumping operations the subsoil, which consisted of wet silt, was abstracted from neighbouring land, causing subsidence, an action for nuisance at common law would lie. The Court of Appeal had not to consider the point, because in that case the statutory powers possessed by the defendants overrode the common law. A subsidence of land from want of support, and a subsidence of water in a defined channel, brought about by the same cause, seem to be closely analogous, yet in the one case it appears an action will lie, whilst in the other the law gives no remedy.

The New Electric Lamps. THE paper read by Mr. W. Tatlow to the Dublin Local Section of the Institution of Electrical Engineers on the probable effect of the new metallic filament high efficiency lamps on the electric lighting industry is a very timely one. He starts by admitting that these lamps have a much higher efficiency than the ordinary carbon filament lamps. If therefore every consumer were at once to replace his carbon lamps by lamps with tantalum, osmium, or tungsten filaments there would at once be a considerable falling off in the revenue of the supply companies. There are several difficulties in the way of consumers doing this. The metal filament lamps at present in the market are much dearer than the carbon lamps, and this prevents many consumers from using them. Mr. Tatlow points out that, with electricity at 4·5d. per unit, it is more economical to use a metallic lamp costing 7s. 6d. (an outside price) for 1,000 hours than to use the ordinary carbon filament lamp, often supplied free by the company, for the same time. A real reason, however, which prevents their universal adoption is that metallic lamps suitable for high-pressure circuits are not yet on the market. The great majority of the companies supply at pressures not less than 200 volts, and for lamps of small candle-power this necessitates special fittings which will enable them to be run two in series, and this limits very considerably the cases when they can be usefully applied. The advent of these lamps considerably reduces the cost of lighting buildings by means of the owners' private plant. A reduction of about 30 per cent. on the estimated cost of the entire installation results by assuming that metallic filament lamps will be used, and it is highly probable that even greater reductions will be possible very shortly. Mr. Tatlow pointed out that the ultimate effect of the cheapening of the methods of converting electricity into light would undoubtedly be beneficial to the electrical industry.

Shrine of an Egyptian King. MR. NAVILLE and his co-adjutors seem to have made a remarkable discovery in digging out the temple at Thebes which formed the sanctuary of King Mentuhetep of the XIth dynasty. In the open court which they had reached last year they had stopped operations at the commencement of a sloping passage, which it has been this year's wo k to clear out. The passage sloped down for about 500 ft., leading to a small room of granite blocks, nearly filled up by an alabaster shrine, made of large blocks of that material, and roofed with a monolithic red granite slab, with a finish of alabaster over that. Mr. Naville gives his reasons for thinking that this was no tomb, but the shrine at which the king was worshipped. The shrine, which is 3½ metres long by 2¼ wide and 2¼ high, is to be left where it is; its removal to a museum would of course be impossible without taking it to pieces, a proceeding to be deprecated for every reason; but we hope we shall eventually see it illustrated in the publications of the Egypt Exploration Fund.

Ely House (Old and New), London, and the Proposed New Dioceses. THE Ecclesiastical Commissioners have sold Ely House, Dover-street, W., for 14,500*l*., and will divide the money between the two new dioceses of Essex and Suffolk. The house, No. 37, having a mitre upon its front, has been the town residence of the Bishops of Ely since 1772. In pursuance of the Act 12 Geo. III., c. 43, the Crown acquired "the capital mansion-house called Ely House, situate in Holbourn, and the sete thereof . . . in order to erect thereon publick offices" in exchange for a capital sum of 6,500*l*., a perpetual annuity of 200*l*. to the occupant of the See, and the building of a house for the bishops upon land belonging to Lord Chetwynd in Dover-street, Piccadilly. The bishops of Ely derived their property in Holborn from the bequest to them by Bishop John de Kirkeby of a messuage and nine cottages on the hill rising from the right bank of the Fleet, and further bequests of adjoining lands and tenements by Bishops William de Louth and John de Hotham, in 1290-1336. Such was the origin of the earlier Ely House, or Place—the home of John of Gaunt and Sir Christopher Hatton—which is depicted in the late H. W. Brewer's drawing, "A Monastic Suburb of Old London in the XVIth Century," published in the *Builder* of January 1, 1898, and as "my lords of ely" in A. Van Wyngaerde's view of about 1550. In 1776-80 the old Place was pulled down, but Charles Cole, architect and surveyor to the Crown, rescued St. Etheldreda's Chapel. The bishops' tenure is commemorated by the carved sign of the tavern in Mitre-court. It is understood that the official residences for the new dioceses will be in Ipswich and Chelmsford.

Italian Gardens. AT the meeting of the Society of Designers, on Tuesday evening, at the Suffolk Street Galleries, Mr. Inigo Triggs gave a lecture (the first which he has given) on the subject which he has made his own in this country—"The Gardens of Italy"—to a large audience. Mr. Triggs, we learned for the first time, was compelled some years ago to winter in Italy for his health, and it was a most spirited policy to make this an occasion for entering on the study of a great and beautiful subject, and thus turning an enforced exile to advantage. The substance of his lecture, as well as most of the illustrations, will be found in his fine book on the subject; but it was interesting to see the views of the gardens reproduced on the large scale afforded by lantern illustration. Nothing interested us more than the illustrations of two garden theatres, with the wings formed by walls of box hedge, advancing one beyond another as the back of the stage space is approached. This is a device which might be tried in the Botanic Gardens here, and in other places in which pastoral plays are sometimes performed. The question was raised, in the discussion, as to whether the designers of some of these vast formal gardens, such as that of the Villa d'Este, really regarded them as complete in the form in which they saw them at the time, or whether they contemplated the effect of them as they are now, with the trees grown up far beyond the scale they could attain in the designer's lifetime. But we have very little doubt on the matter. To most of us the Villa d'Este garden is probably much more beautiful now than it was when first laid out; but we do not think the designer looked at it that way. What he wanted was a strictly symmetrical design with trees spaced and proportioned just as his design required; and we doubt if he troubled himself about their future effect under the developing hand of Nature.

The Goupil Gallery. A COLLECTION of small water-colours by Mr. E. Newell Marshall (of Lowell, U.S.A.), now on view at the Goupil Gallery, is of interest as the work of an American, and as showing a fine perception for colour, and a kind of inspiration in conveying the feeling and character of a scene without anything like realistic imitation, and (it must be added) without the slightest regard to precision of form or line. These belong in short, to the "blottesque" school of water-colour, in which colour effect is everything and form nothing. This shows worst in the few marine subjects. Apparently it is sufficient now to put on paper a number of brush dabs, of no shape or line at all, and say it is the sea: which is very easy art. The best part of the collection is the series of studies of birds, because the artist has had full scope for colour and yet has been compelled to attend to correctness of line to some extent, in order at least to simulate birds.

FISHPONDS, BRISTOL.—The building has been begun of a church-hall, and part of a church, after the plans and designs of Mr. Ellis (of Messrs. Lingen Barker, Son, & Ellis) as honorary architect. The entire scheme includes a vicarage, and will occupy a site of two acres—the gift of Miss Castle, of Stapleton; the cost of the church will amount to 9,000*l*. It is stated that as the parishioners have not at present any further funds available they have undertaken to furnish voluntary labour for the excavation of the site for the church-hall.

LOMBARD-STREET.—The new buildings which have been erected within the past eleven months occupy the site of Nos. 1-6, between Mansion House-place and St. Swithin's-lane, and of the Gresham Club. The Scottish Provident Institution take a portion of the premises, a suite of rooms on the ground floor of No. 2 have been rented by the Canadian Bank of Commerce, and the Union of London and Smiths' Bank remain at No. 1, formerly the site of the offices of Messrs. Smith, Payne, & Smiths Messrs. Dunn & Watson were architects to the Scottish Provident Institution Buildings, Ltd., and Messrs. W. Cubitt & Co. were the contractors. Of the former block, built after Sir Robert Smirke's designs, and the improvements on the site in 1824-30, some particulars are given in our columns of September 15 last.

SLATE-QUARRYING AND DRESSING.

By EDGAR J. SCAIFE.

THE quarrying of slate for the purpose of conversion into roofing slates is carried on in Wales either by the system of open quarrying or by mining underground. The former is the one most generally adopted, although large quantities of slate are obtained by the latter process.

Of the open quarry system, two methods are adopted of opening up the quarry. One is that employed at the famous quarries of Lord Penrhyn at Bethesda, the largest in the world. This quarry is worked on the system of galleries (Fig. 1), which shows a section of the quarry. Each of the gallery faces is about 60 ft. high, and altogether there are nineteen galleries, making a

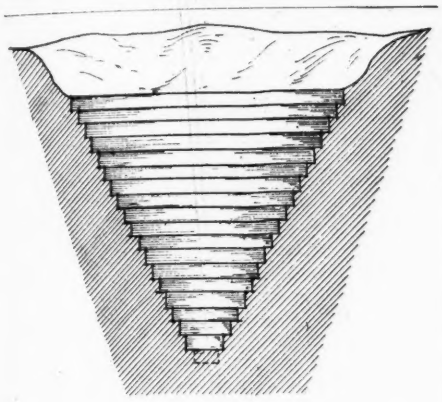


Fig. 1.

total depth of about 1,200 ft. The width of the galleries varies according to the amount of rock worked from them—from about 30 ft. upwards. Along the galleries is laid a light railway to carry the trucks containing the rock. The working of each face of the galleries widens out the quarry, and when the lowest gallery is sufficiently wide enough another gallery is commenced by opening up a hole in the bottom (see Fig. 1). The trucks conveying the slate are run along the railway to lifts worked by hydraulic machinery, which convey them to the top of the quarry, and from there taken to the sheds, where they are converted into slates. The other method of open-quarrying does not make use of galleries, the face of the quarry being almost vertical or sloped at a very

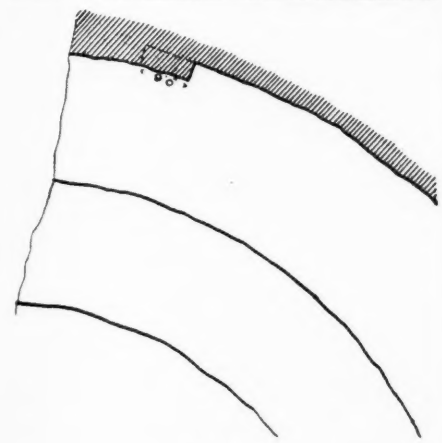


Fig. 2.

small angle to the vertical. The quarrymen descend by means of iron ladders to execute the blasting of the slate-rock, while the rock itself is conveyed to the surface by means of wagons travelling on an overhead wire-rope. Three or four of these are placed across different parts of the quarry, so that any part may be accessible. The system of underground quarrying is very different from the open quarry system. Owing to the dip of the veins of slate-rock which in parts run under large masses of igneous rock, it is an impossibility to work them at a profit by the open-quarry system. They are, therefore, worked underground by a series of floors about 50 ft. or 60 ft. below each other, and the slate-rock is worked out upon each floor in openings or chambers 50 ft. to 70 ft. wide. These chambers run from top to bottom of the workings. Enormous walls or supports of slate-rock 40 ft. wide are left unworked between each chamber to support the mountain above, as shown on the plan, Fig. 5, which shows a small portion of the workings.

The quarries of the Oakeley Slate Company, at Blaenau-Ffestiniog, the largest underground quarries in the world, are a typical example. These quarries are situated in the side of a mountain, and the strata of slate-rock run almost parallel with the side of the mountain (Fig. 6). It dips into the earth at an angle of 28 deg. to 33 deg. toward the N.W., and strikes from N.E. to S.W. The veins or beds are five in number; the lower or new vein, lying on the felspathic trap bed rock, varies from 30 ft. to 50 ft. in thickness; the main or old vein, which comes next, averages about 200 ft. in thickness; the small or stripey vein coming next, is about 30 ft. in thickness; and the back vein on top is from 40 ft. to 70 ft. in thickness; the north vein on the top of the back vein is about 100 yds. in thickness.

These veins are separated from one another by interbedded trap rocks and other rocks of igneous origin. All the veins are worked, so that in parts of the quarries there are five series of workings one upon another, and twenty-five different floor levels, about 55 ft. between each floor, the total vertical depth from the top of the highest floor to the bottom of the present lowest floor being about 1,430 ft., and the longest underground level about 1¼ miles in length. The different floors are reached primarily by main levels leading from the mountain side into the workings at different heights, and from these levels the other floors are reached by means of inclined planes, or tramways worked by steam-power, having turnouts at the levels of the various floors, from which access is gained to the workings. The method employed of opening up a new vein is shown in Fig. 7, which shows the vein in process of being worked. The tunnel A (about 6 ft. wide and 7 ft. high) has been driven through the supporting pillar of rock from a previous chamber. If this is on the level of the highest floor, the slate-rock is worked forward and upward through the thickness of the

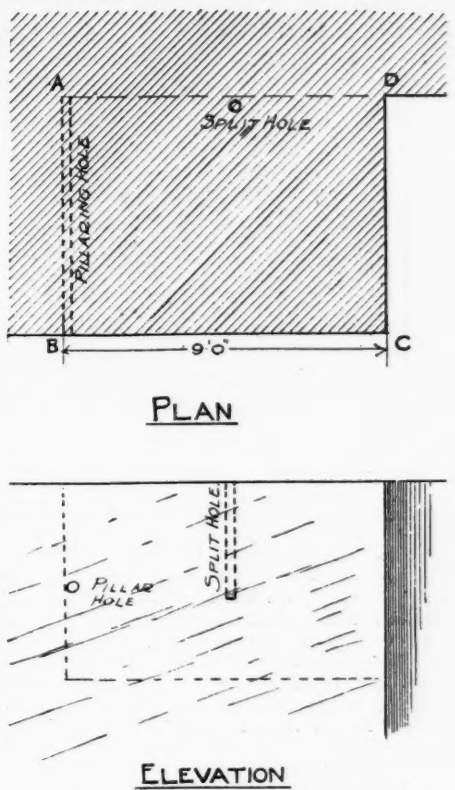


Fig. 3.

vein, until the total thickness has been worked (in this case 85 yds.). The vein is now followed by working the next floor below (floor N). A similar tunnel to the last (A) is driven through the intermediate rock from a previous working.

Before the quarrymen begin to work the rock, a roof tunnel 4 ft. high by 6 ft. wide is cut out by the "miners," and continued until it emerges into the former workings above, as shown on floor O, where the tunnel B has been driven through from a previous

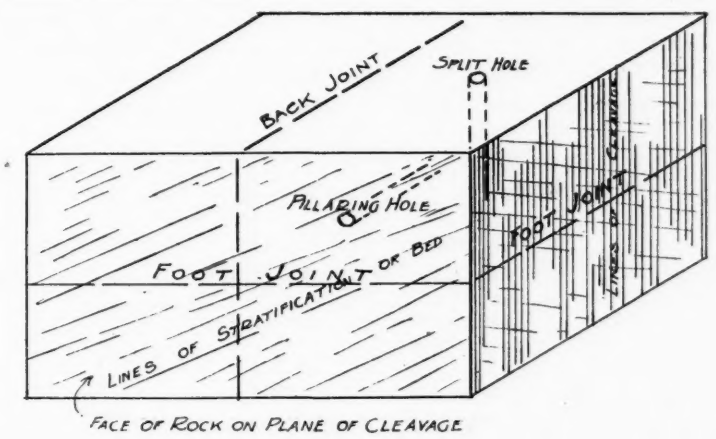


Fig. 4.

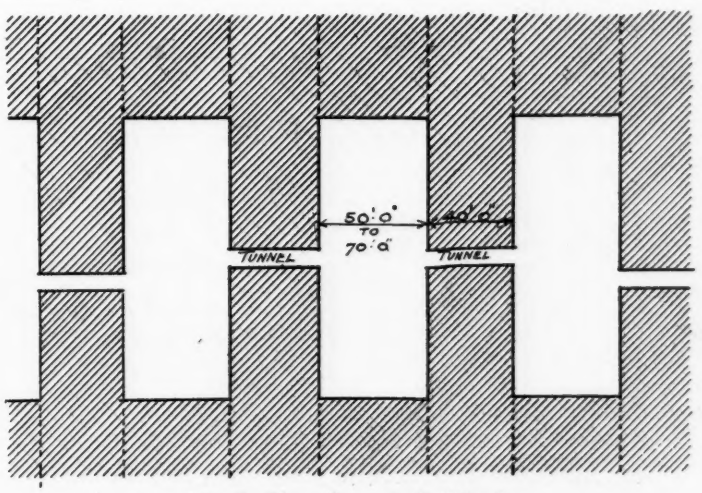


Fig. 5. *Plan along A, B, Fig.* 6.

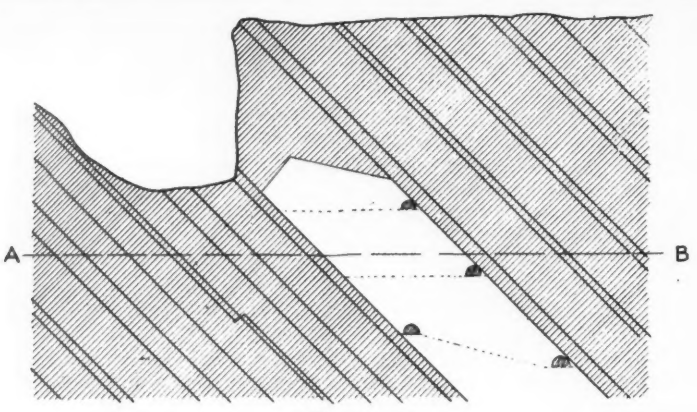


Fig. 6.

working, and the roof-tunnel driven as shown. The quarrymen then enter, and again excavate the full thickness of the vein. This process is repeated at every floor downwards until this length of the whole vein has been worked out. In the main vein there is an average perpendicular depth from roof to floor of 180 ft. In some cases the floor below is worked before the one above it is finished, which necessitates the driving of another tunnel to get at the chamber. The slate-rock is conveyed by means of a light railway to hydraulic lifts, and thence to the converting-sheds.

The same system of blasting the rock prevails in all the quarries, varying only as the strata and cleavage alter in their direction. In the open quarries the cleavage runs vertically, or almost so, with but a small inclination to the vertical. The strata run at a small angle or "dip" to the horizontal (see Fig. 4). The system adopted at the Penrhyn quarries is perhaps typical of the general process. The quarry face of each gallery is worked in lengths of about 9 ft. (see Fig. 2). The greatest possible advantage is taken of the "joints," "splits," and cracks in the rock. The joints are of two kinds, what the quarrymen call "foot" joints and "back" joints (Fig. 4). The foot joints are more or less horizontal, sometimes perfectly so. The back joints are more or less vertical, or may be entirely so. When these joints are regular, it is possible to loosen big blocks of slate-rock by driving steel wedges into the joints, and then to dislodge them with levers, thus avoiding drilling and blasting the rock with powder. In the absence of convenient "splits" and "back" joints, drilling and blasting are resorted to. A vertical hole is drilled a few feet back from the face of the rock and along the plane of cleavage (see Figs. 3 and 4) to a depth determined by the "foot" joint, usually to about half the depth of the joint. This is called a "split" hole. It is made with a steel drill. These drills vary in length from 2 ft. to 9 ft., $\frac{3}{4}$ in. diameter, and $1\frac{1}{4}$ in. point. Or a jumper is sometimes used, which consists of a long drill with a swelling halfway in its length. This is worked up and down and given a twist each time, the swelling providing the necessary weight to bring it down with some force. The Ingersoll-Sergeant drill, working by means of compressed air, is now largely used. The "split" hole having been thus formed, a small quantity of gunpowder is put in it, just enough to split the rock. Fuse for igniting the powder is now inserted, and then the hole filled up with slate-dust. A horizontal hole called a "pillaring" hole is now drilled on the adjacent side from the face of the rock right into the newly-got "split" or crack, and at such width as the block is required. This hole is filled up with powder, and when this is fired the block is separated from its remaining side and burst out. The large block thus removed is split up by means of a chisel and hammer into blocks 3 in. thick along the cleavage. This is simply accomplished by holding a chisel at one end, its point in line with the cleavage, and striking it sharply with a heavy hammer. Owing to the perfect cleavage, the blocks split into two parts in a perfect plane. They are then "pillared," or split across the cleavage and along the grain of the rock (like the "back" joints) to the required width of roofing slates. They are then sawn across the third direction by means of circular saws working in water. The Penrhyn slates can be cut across in the third direction by cutting a small notch in the side of the pillared piece, turning it once, and striking with a heavy wooden mallet on the other side, opposite the notch. By this "cross-cutting across" process, a splitting end of the block is obtained almost as clean and even as a sawn end. The slabs are now ready for the slate dresser. He takes one between his knees and carefully drives in a long wide and thin chisel with a wooden mallet, dividing the slab into two parts. He then repeats the process to each half until he has split them into the required thicknesses. When the slab is very thin and is being divided, great care is necessary, and two chisels are used, the dresser working the slab with both chisels, one in each hand. The slabs, now slates, are then trimmed to the required size, and the rough edges squared. This is done by placing the edge of the slate on an iron traverse fixed to a wooden bench and dressing off the edge square with a trimming knife. When two edges have been trimmed the required size is marked on by

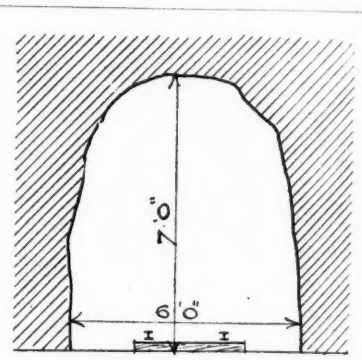


Fig. 8.

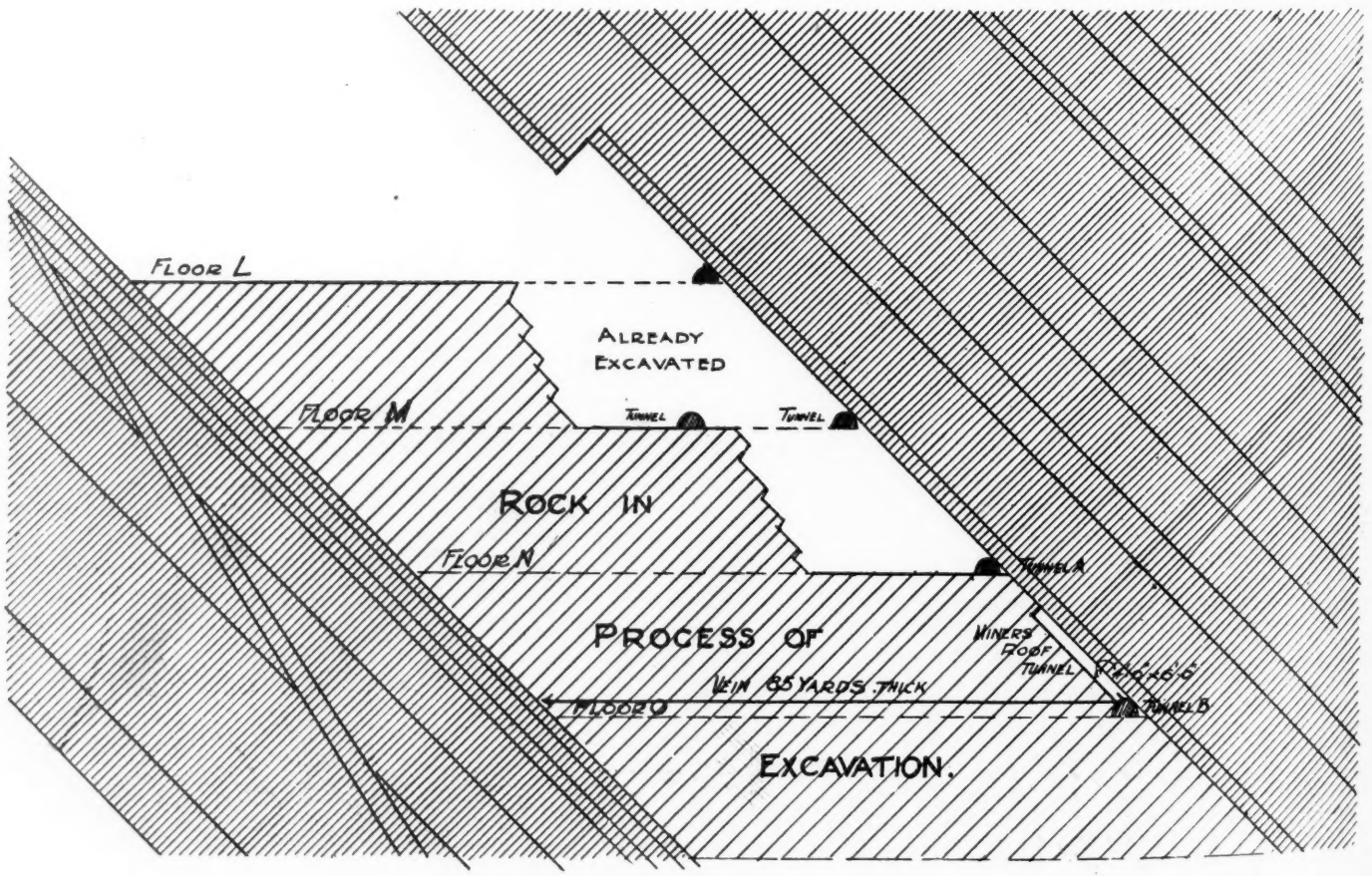
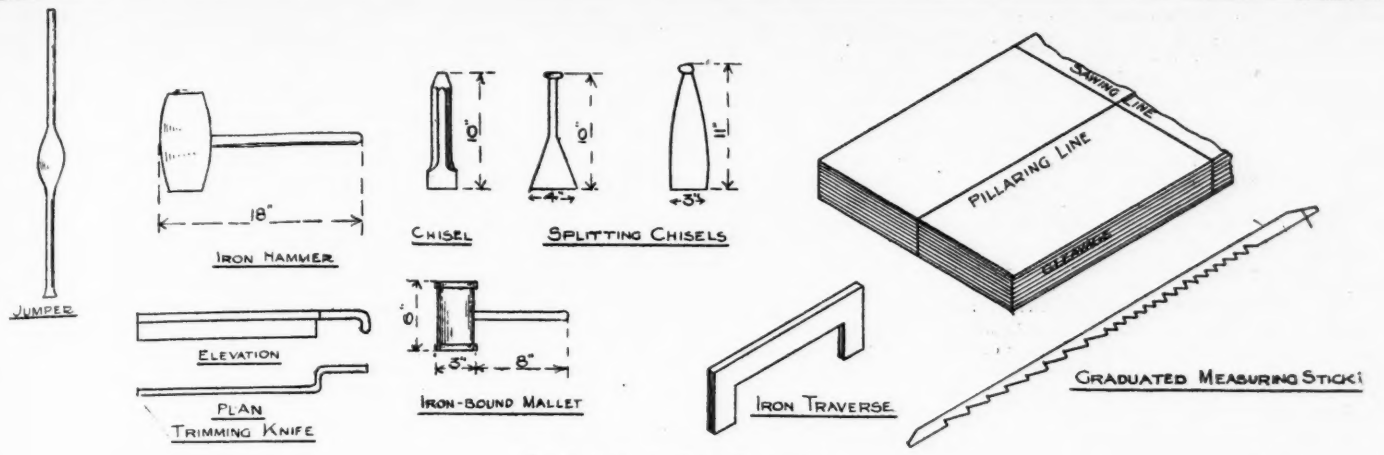


Fig. 7.



Tools Used in Slate-Quarrying.

means of a measuring-stick. This consists of a stick notched into graduating notches to give every size of slate. The notch is caught on the edge of the slate, and with a rapid movement the nail is scratched across the other end. This is done to both the remaining edges and they are then trimmed to this size.

The trimming is now done in most quarries by machinery. The knives are fixed to a revolving drum which trims the edges of the slates, being gauged at the same time by an iron gauge fixed at the side, this also acting as a gauge for the right-angle, ensuring the squareness of the slates.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE usual meeting of the Royal Institute of British Architects was held on Monday, at 9, Conduit-street, Mr. E. T. Hall (Vice-President) being in the chair.

Mr. Taylor (Assistant Secretary) announced the decease of Mr. George William Hamilton Gordon, Director of Public Works in the Orange River Colony, elected as Associate in 1886 and a Fellow in 1906.

A paper was then read by Mr. Stanley Hamp on "Hotel Planning."

The Chairman, in introducing Mr. Hamp to the meeting, said, as they were aware, he was the partner of their President, Mr. Collcutt, who was most anxious to have been present, but who, owing to illness, had had to go to Spain.

Mr. Hamp then read his paper, of which the following is an abstract:—

Mr. Hamp, in introducing his subject, showed how development in hotel construction had gone hand-in-hand with improvements in locomotion, and he put upon the screen illustrations of some interesting old examples of inns which still survive. Reference was made to the inn sign-boards of olden days, to the origin of some of the signs, and to the accommodation and characteristics of the old inns as described in literature of the period. Motorists, the author thinks, will probably bring back to the inns on our rural high roads much of the custom and prestige which they lost through the disappearance of the stage-coach. Hotels used in the past for coaching and posting purposes have more than sufficient stall accommodation for present requirements, and it would be a simple matter to adapt it for motor garage.

Discussing modern hotels, which he divided into three classes—viz., residential hotels, commercial hotels, railway hotels—the author said that as regards design the usual tawdry and showy character should be avoided, and the building be designed with a simple architectural treatment. It should be, as far as possible, fireproof, and should have one or more fire-escape staircases arranged with escape-exit at each corridor. It should be so planned as to minimise the staff as far as possible. The main entrance should be inviting; the rooms light, but not too large. There should, if possible, be only one entrance and exit for the staff.

The usual accommodation of the modern hotel might be stated to consist of a lounge or winter-garden; dining-rooms, restaurant, coffee-room, with services adjoining; reading and writing-room; small drawing-room; smoking and billiard room, with bar attached; ball-room, with reception-room attached; office and manager's room; gentlemen's lavatory and cloakroom; ladies' retiring and toilet rooms. In the basement are situated the kitchen department and offices, the staff dining-rooms, servants' hall.

Often one or two private dining-rooms are required. In the provinces a large hall for public banquets and meetings is necessary, in which case a separate service should be arranged with a separate kitchen. In large hotels a barber's shop is a useful adjunct. The author recommended also for large hotels a bakery, and a dairy as well if it can be afforded. The upper floors are usually devoted to bedrooms, bathrooms, water-closets, and service-rooms, of which there shuld be one on each floor fitted with sinks, hot plates, etc., in direct communication with the kitchen, and adjoining which the service-lifts to carry coals, etc., should be arranged Ladies' and gentlemen's lavatories should be away from each other, and cut off from the main corridor by a ventilated lobby. The dining-room, especially in large towns, should be provided with an orchestra, and where a ballroom is impossible the dining-room should have a dancing-floor. Some of the rooms on the upper floors should be arranged in suites, with sitting-room, one or more bedrooms, with communicating-doors, small hall, from which should lead bathroom and water-closet. Communicating-doors between rooms should be double, sash-windows made reversible so as to be cleaned from the inside, and double-windows fixed to windows facing main thoroughfares. Heating coils should be placed in all public-rooms, staircases, corridors, and landings; and fire-alarms and hydrants provided in all public corridors.

The author summed up as follows the essential features in planning an hotel:—(1) The maximum amount of light and air; (2) A simple and direct plan; (3) A proper distribution of the working and managerial parts of the hotel, and easy and direct service communication to the public and private rooms; (4) Centralisation of kitchen and offices; (5) Perfect sanitation; (6) Adequate means of escape in case of fire and panic. The author dealt with these points in some detail, and touched upon such matters as telephone-service, "vacuum" cleaning, etc.

On the subject of ventilation, reference was made to the system in use at the Midland Hotel, Manchester. Here, by means of two fans revolving 180 times per minute, 2¾ million cubic ft. per hour of fresh air, cool in summer and heated in winter, are introduced into the building. The air is filtered through a screen of special material, which has an area of 320 sq. ft. exposed to the air inlet. This screen extracts all the soot and chemicals, clearing the air as it passes through, the largeness of the area of the screen making the resistance to the fans as little as possible The air extraction and ventilation of the guests' rooms should be absolutely separate from the other portions of the buidings, and special attention should be given to the extraction of air and heat from the kitchens, laundries, and such places, especially if they are in the basement.

As regards fire-alarms, the author considered the right course was to give the alarm only to the officials and the staff. If a universal alarm be given a serious panic might easily arise, whereas the action of a well-trained staff might avoid a serious outbreak in the event of actual danger. One service-room on each floor should be equipped with an indicator and an alarm-bell. On the face of the indicator would be numerous little apertures of about 1 in. square, each aperture representing a corridor on the various floors. Therefore, should a fire break out in the main corridor on the sixth floor, and the alarm be given, the bell would ring in the service-room on each floor, and upon every indicator would appear a red disc in the aperture, "main corridor, floor 6th." Thus the staff on each floor would know exactly in which corridor the fire had broken out.

The internal arrangement of kitchen and offices most concern an hotel manager, and the architect should, where possible, consult him if he is to obtain satisfactory technical results. The kitchen is the laboratory where the reputation of the hotel is made or marred, and the kitchen staff should be given plenty of light and ventilation; the ranges, grilles, ovens, and hot plates should be of the best procurable, and plenty of utensils should be at hand. The walls of kitchen, scullery, and larders should be either white tiles or glazed brickwork, and the floors of stone or "granolithic" or terrazzo. With the application of electrically-driven propelling fans and tubes for the supply of fresh air, and extracting fans fixed at the top of vent-tubes, and vent-shafts, it is now recognised that the most convenient position for the kitchen is in the basement.

The author dealt in detail with the requirements and arrangements of the various sections of the kitchen department, the position of the service-rooms, ice and ice-making department, sculleries, pantries, larders, various stores, cellars, lifts, etc. In conclusion, a list was given of the fittings installed at the recently-opened University Hotel.

Numerous plans and views of hotels in Great Britain and abroad were exhibited as illustrations.

Mr. John Slater, in proposing a vote of thanks to the reader of the paper, said they were greatly indebted to Mr. Hamp for the trouble he had taken, and for the numerous drawings which he had made and shown them on the screen. The subject was such a very big one, and the matters pertaining to a large hotel were so numerous and of such great importance that it was almost impossible to follow Mr. Hamp in many of the details he had described. The plans shown also were, of course, so complicated that one would want to spend some hours studying them before being able to criticise them with any advantage. The first views which Mr. Hamp showed them of old inns were extremely interesting, as were also the allusions to the curious designation of many of the signs which still survived. Mr. Hamp mentioned one or two, and probably many present knew of others which had been a source of curiosity. For instance, there was the "Goat and Compasses," which he believed was a corruption of the phrase "God en-compasses us"; and "The Bag o' Nails." which was the title of one or two inns in the country, and was really "The Bacchanals." It was curious and amusing to notice these corruptions, which had come down from old times. Really, however, the subject was so extensive that one hardly knew what to talk about; but there was one

thing which Mr. Hamp mentioned, which was that there should if possible be only one entrance and exit for the staff. Well, that was a counsel of perfection, because they had the London County Council to consider, and one of the requisitions which the London County Council made was that in hotels, whether large or small, the means of exit from the basement and ground floors wherever they might be should be arranged in such a way that the doors could be opened by a mere push from the outside He happened to be engaged in the erection of an hotel now, and he pointed out to the London County Council officials that practically such a requisition made it almost impossible to manage an hotel, because if they had a certain number of exits which could be pushed open without any control at any hour of the day or night they were liable to have extremely undesirable characters entering the hotel. He was bound to say that the London County Council officials admitted the force of the argument, but they said that they were not hotel managers, and were only concerned with the possibility of getting people out of the building in case of fire. The matter was further complicated by the fact that the London County Council requisitions appeared not to recognise that in a modern hotel the whole building was made practically fire-proof, and in such a case there was very little danger of a fire. There was, however, of course, the risk of panic from other causes, and no hotel manager could afford to ignore such a risk, and consequently they had to provide not necessarily against danger from fire, but against panic from smoke, and this put upon them the necessity to arrange for nearly all the floors separate exits, either downstairs, or, he believed, the London County Council were satisfied if they could get all the guests up to the roof by one staircase and down by another. Of course, in London, where land was extremely valuable, and where the area of a site was somewhat limited, this created a very great difficulty which anyone who had had to deal with hotels must have felt, and one had to do the best one could to get over it. The arrangement of the kitchen on the ground floor was also in most cases a counsel of perfection, because there were very few instances where the area of the site was sufficient to allow of the kitchen and service-rooms and various rooms which must be connected with the kitchen being placed on the same floor as the coffee-room, restaurant, &c. Therefore, they were bound in most cases to have the kitchen in the basement, and he quite agreed that such an arrangement was infinitely better than putting it on the top floor as was occasioally done some years ago in certain hotels. The lavatory accommodation of an hotel was certainly one of the things which required very careful consideration, and he had always himself inclined to the opinion that it was very desirable, if they could, to have the water-closet and bath-room close together and shut off by a lobby, because if they had this the heated pipes which went into the bath-room made that portion of the building rather warmer than the corridors of the hotel, and the consequence was that there would generally be a draught from the corridor into the bath-room, rather than the other way, which was a very great desideratum.

Mr. E. A. Gruning, in seconding the motion, said that from the earliest period that he had entered the profession he had studied the question of the planning of hotels, and having carried out one or two more or less successfully, he quite recognised the difficulties which Mr. Hamp and his well-known partner had had in carrying out the Savoy Hotel extension so successfully. The difficulties of hotel planning were very great. The architect was hampered by the nature of the site, the requisitions, and by the nature of the trade which had to be carried on, but he did think that sufficient stress had not been laid on the most important man in the hotel—the cook. First came the cook, and after him the wine-waiter, and no hotel could succeed, however well designed and built, without a good cook. He could enlarge on a great many points in connexion with the arrangements of an hotel, but he felt that they had all so enjoyed the paper that he would not do more than express his entire concurrence with the vote of thanks as proposed by Mr. Slater.

Mr. W. Woodward supported the observations made by the previous speaker with regard to the paper, and said he thought they would all agree that the planning of an hotel required as much skill, thought, and knowledge as the planning of any building which could be erected in this or any other country. The enormous amount of detail which had to be thought of to make an hotel successful must be apparent to all who had listened to the paper; and, having been in the Savoy Hotel, and also stayed a few days in the delightful little hotel at Algeciras, he ventured to say that there was no firm of architects who knew more than Messrs. Collcutt & Hamp as to the proper designing of an hotel. His idea in making a few remarks was to emphasise a few points which had arisen in the erection of the Piccadilly Hotel. Mr. Hamp summed up the requirements of an hotel in one sentence. He said, "You should have abundance of light and air, comfort, good attendance, an excellent cuisine, and perfect sanitation," and the planner of an hotel who could conform to these requirements would, he thought, do all that was necessary both for the client and the public. But there was one feature in the planning of hotels which they should all consider and endeavour to attain if possible, and that feature was well exemplified in Mr. Cutler's plan of the Metropole at Folkestone, and had been followed more or less by Mr. Hamp. That was simplicity of planning of the upper floors. A corridor with a window at each end was about the simplest and best plan which could be adopted for an hotel, and those of them who had been abroad and had come home perhaps rather late knew how delightful it was to know they had got to their right corridor. Another important point which Mr. Hamp touched upon, and which Mr. Gruning had mentioned, particularly in De Keyser's Hotel, was economy of service. There were one or two hotels in London where, he ventured to say, it was impossible for the managers with the utmost care and attention to secure a financial success, because the service had been so badly planned and the employment of an enormous staff was necessitated. Those of them who had studied in detail the planning of an hotel knew that one of the greatest points was to secure this economy of service if financial success was at all to be expected. Then immense progress had been made in the provision of larder accommodation. He remembered, at the Elysée Hotel, in Paris, he was taken to the larders and particularly the live-fish larder. They went down to a beautiful apartment with glazed bricks, and saw the live-fish swimming in a tank. They chose their fish; the chef brought his net, and it was served a short time afterwards. That was perfection. With regard to the army of servants to which Mr. Hamp had referred, there was an hotel in London where, beneath the ground floor, scarcely ever seen by visitors, there was a staff of over 200 persons, and when they remembered that many of them were expensively paid, they would realise that it was not all gold that glittered. As regarded the ventilation and heating of a very large hotel, he confessed it was a thing he did not feel competent to administer, and in the case of the Piccadilly Hotel it was very properly left to an expert thoroughly accustomed to deal with such matters, and therefore he was relieved of any responsibility in that connexion. An important matter was that of locks, especially to the bedroom doors. They wanted a lock which would prevent the entrance of persons at inopportune moments, and which could only be opened by the masterkey of the manager in the case of suicide or illness, but at the same time they wanted the lock to be simple, so that a visitor coming home rather late at night could understand it. Another important point was to have perfecly sound-proof partitions. In the Piccadilly Hotel they had tried many, and had at last arrived at what they considered was the right thing. It was only $4\frac{1}{2}$ in. to 5 in. thick, and prevented sound travelling from one room to another. The double doors to which Mr. Hamp had referred were also important, and he believed that the reader of the paper suggested that a slab of asbestos should be placed between the doors to prevent the transmission of sound. As to the question of lavatories in the Piccadilly Hotel, they were fitted with hot, cold, and waste-pipes, so that they did not have to call to the chambermaid to get hot water. He believed that for a London hotel it was absolutely necessary to have double windows to prevent noise penetrating to the rooms, and the difficulty of making these double windows when there were French casements was very great, having regard to the necessity of the cleaning and the opening and the shutting of them. That applied also to transom lights. Mr. Hamp had told them how he got his visitor into the hotel and fed him, heated him, slept him, and washed him, and he had also provided for getting him out again by the most safe fire-proof exit which he could obtain and which the London County Council would permit.

Mr. E. Runtz said that this question of hotel planning was one which should have aroused greater attention at an earlier period than it had. Hotels were one of the most essential features of life at the present moment, and when it was his privilege to go into the question he was very much impressed by the fact that hotel accommodation went hand-in-hand with locomotion. If they went back to the old coaching days they found the old coaching yards and stables, but when railways came in about 1826 terminus hotels sprang up for the convenience of commercial travellers and that was the beginning of the big hotel enterprises in this kingdom. One of the first hotels of that description was the St. Pancras Hotel, built by Sir Gilbert Scott. After that period they would find that steam locomotion commended itself to the general population throughout the world, and a steam service across the ocean enabled people to come to this country, not only for business, but for pleasure, and it was found that the terminus hotels were insufficient for all purposes, and this was the beginning of the hotel raised for pleasurable purposes, such as the Langham, built in 1861, and which had been a continuous success since. Now they were going a little bit beyond that and finding, as Mr. Hamp had said, that the advent of the motor-car would preserve to them some of the old inns. For once in a way, therefore, perhaps a modern invention might prevent vandalism. The subject before them had many ramifications, and there were many difficulties which arose not only with regard to the client in the first instance, but also with regard to the site. Mr. Woodward suggested that they should arrange for a window at the end of each corridor, and while he agreed with that yet often it was impossible. With regard to the economy of service, it all depended upon the nature of the hotel. They had seen plans of the Waldorf, the Ritz, and the Savoy Hotels on the screen, and there was no doubt that with the Savoy Messrs. Colcutt & Hamp had immense difficulties. They had to make a silken purse out of a sow's ear. The other two architects had a clean sheet, but sometimes that was one of the most difficult problems. With regard to planning, however, he could say he had never seen anything better than the Waldorf and the Ritz. He did not know which was best, except that in the Ritz there was a little waste with regard to the luxurious baths in the centre. Mr. Woodward had referred to partitions, which was a most important matter, and he had heard of the asbestos slab between the double doors. It was always wise for an architect to come into contact with those who were concerned in making an hotel commercially successful, and one manager said to him, "Don't put asbestos, but put a spare mattress; it is just as good." Kitchens were very important, and, having had something to do with hotels and restaurants, he tried as far as possible to keep the arrangement of the kitchen back till the appointment of the manager, because he had always found that if they fitted up the kitchen and services before the manager was appointed the first thing the manager did was to rip the whole out. He would be a little egotistical, and refer to the Gaiety Restaurant, with which he had had to deal. There they had flats on the top and banqueting halls of various size, and the service wanted specially dealing with. They arranged for three services, and they had a kitchen in the basement and a kitchen at the top. From the top they worked the flats and the special banqueting halls, and from the bottom the restaurant and general hotel work, and they found it answered admirably, and there had been no hitch from the start to finish. He did not think it was possible to fix on any absolute principle with regard to the kitchen and service until they absolutely knew the class of business they would have to deal

with. There were so many varieties of hotels and restaurants that it must be left to those who had to govern the whole concern and make a commercial success.

The Chairman said that Mr. Hamp had brought to their notice that which was certainly one of the most important problems in big cities, viz., the building of large hotels which were the feature of the last twenty-five years. He remembered that when the Langham Hotel was built everyone said it was far too large, and could not possibly last, but that was a perfect baby now as compared with recent hotels. It showed the development and change in social life and in the social conditions of the country. Many people who used to have town houses now lived in hotels, and although the prices at hotels were very high, yet it was said that it was cheaper than a private house would be. It rather staggered one to know the prices that were paid in some of these places. Four or five guineas a night for a bed appeared to be quite an ordinary charge in the eyes of the hotel manager. Mr. Hamp had drawn attention to so much detail that he was quite sure his paper would be a text-book which would be referred to by many who were studying hotel construction. It was one of the features of that Institute that the men who did the work gave away all their thoughts to those who were coming behind and cutting them out. He would like to refer to the question of electric plant and heating. He quite endorsed all that Mr. Hamp had said with regard to the economy of having an electric plant in a big institution. They would find that the exhaust steam from the engines which had to drive the electric plant would do the heating, and this would mean the saving of 300*l.* or 400*l.* a year when dealing with a large hotel like the Carlton, and it might mean a saving of 1,000*l.* a year. Another little point was that of fire-alarms in an hotel, which were a very essential feature, because one of the great things which made an hotel a success was the feeling of security which people had, and which hotel managers were very much alive to. There were various appliances for ensuring the avoidance of panic in the event of fire, and Mr. Hamp had dealt in detail with some of these. In connexion with fire-alarms, it was a very usual practice to have a lamp on which the direction of the exits was marked on every floor, so that if an alarm was given and one came out of the bedroom, one would know where to go at once for the staircase. A year or two ago he had to make careful surveys and report on some of the big hotels in London—the Carlton, the Russell, and the Great Central—and he was struck with the great care paid to this matter. With regard to vacuum cleaning, it was astonishing what developments had taken place. The latest was to have a vacuum cleaning apparatus attached to engines in the basement and with tubes fitted to the skirting of every room in the building, and all an attendant had to do was to take the cap off and all the dust was drawn through the tubes. As to the position of the kitchens, there again it was very wonderful to notice the great differences in planning, and it really meant what Mr. Runtz had said, that every building must be planned to suit its particular site, and to suit the particular style of the hotel. In the Hotel Russell there was a magnificent kitchen, lighted entirely by windows at the side. In the Carlton the kitchen was right in the centre of the building underneath the big dining-room and garden. It was quite a remarkable sight to go down and see the vast staff working absolutely in artificial light, and yet in a well-ventilated place. A great feature about the security of an hotel was the egress from the staircase. In the St. Ermin's Hotel, a building designed by himself twenty years ago, there were six main staircases, every one of which went up to the roof, and persons could escape by every one of them, and could come down any of the others. This was a subject which required the greatest care and attention, and it was not a point in hotel planning which was always attended to with the care which he thought was necessary. He remembered one hotel where he found the fire-escape staircase went down into a pit in the basement where there was no possibility of anyone getting out.

The resolution was then heartily carried.

Mr. Hamp, having thanked those present for the way in which the paper had been received, said he felt that he had only touched the fringe of the question. It was so large a subject, and one which could not be dealt with in a short time. He would have liked to have explained the details of the various plans which had been shown, but that was impossible in the time. He would, however, like to take the opportunity of thanking Mr. Runtz for lending him the slides they had seen, and the assistance he had given him.

The Chairman announced that the next meeting would be held on April 22, when Mr. A. W. Weissman would read a paper on "Picture Gallery Buildings." He was coming over especially from Holland to read the paper in person before the Institute, and he hoped members would make it their business to be present in order that their distinguished hon. correspondent might receive a warm welcome.

The meeting then terminated.

THE SURVEYORS' INSTITUTION.

AN ordinary general meeting of the Surveyors' Institution was held on Monday at No. 12, Great George-street, Westminster, S.W., when a paper was read on "Underground Water: A Discussion of Certain Recent Enactments Affecting Water Rights," by Mr. W. Vaux Graham and Mr. Harold F. Bidder.

The authors stated that they had endeavoured to trace the extent to which Parliament had, in private Bills, modified the law with regard to underground water, and the reasons which had impelled its action. They briefly summarised the effect of the cases collected by Mr. Shirer Will, K.C., in a paper read before the Institution in March, 1900, by saying:—

1. That every owner of land is owner also of everything between the surface of his land and the centre of the earth, including all water that may lie or be flowing or percolating there, with the sole exception of water flowing in a defined and known channel. But this ownership of water only exists so long as the water happens to be under his land. He has no right to retain it there.

2. As a consequence of this ownership he may, by pumping, attract the underground water from under his neighbour's land, though by so doing he does his neighbour the greatest damage. Such damage is *damnum sine injuria*—"hurt, but not legal wrong"—and his neighbour has no remedy, except possibly in the case of a right to have the surface of his land supported by underground water, which may perhaps be gained by prescription.

3. But if the underground water flows in a known and defined underground channel, then the same law applies to it as to a river on the surface, viz., each owner through whose land it passes must allow it to flow unimpeded, and may only abstract from it a quantity of water sufficient for his reasonable use.

They then dealt with cases decided in the courts since 1900. As to the case of Bradford Corporation *v.* Ferrand, Farwell, J., assumed for the purpose of his judgment that, as the plaintiffs alleged, the water flowed to the spring in a defined but unknown channel, and he decided that the defendant was within his rights. "No one can tell," he said, "where or in whose land this hypothetical stream runs. If the plaintiffs are right, no proprietor of land above the spring can sink a well or make excavations on his own ground without the risk of incurring liability possibly to a very large amount to the plaintiffs for interfering with the spring, and this is a much larger liability than was unsuccessfully sought to be established in Chasemore *v.* Richards, for a defined underground stream may flow for miles, whereas the gathering ground of water penetrating by percolation is of comparatively small extent."

In basing his decision on the prevailing ignorance as to underground water conditions, and the impossibility of asserting or defining rights in the unknown, the learned judge took the foundation upon which the whole law as to underground water was raised. A right in underground water was regarded as something too intangible to be protected by rules of law; it might, so to speak, materialise at any time in unexpected places, and could not be acknowledged in practice without introducing great confusion and uncertainty. On the other hand, it might be said that our knowledge of underground water conditions was constantly improving, while the ever-increasing demand for water rendered the existing anomalies more and more burdensome. It might, at least, be suggested that the principles laid down by the learned judge would apply to protect underground waters that appeared from time to time on the surface in what were known as bourne flows. The persistence of the bourne in breaking out in the same locality established the presence of an underground stream there, and gave it a *terminus a quo*.

Another recent case of importance dealt with the effect of pumping operations upon rivers. Once water had emerged from the ground and found its place between the banks of a stream, it might then not be withdrawn from that stream directly, except by riparian owners for reasonable use upon their property. But suppose that pumping operations so lowered the level of the underground water that some of the water that would otherwise continue to flow in the stream percolates through the river bed into the strata beneath, and so was lost to the lower riparian owners. In that case it appeared that the latter had no remedy, unless the persons pumping actually obtained water that once formed part of the stream; that was to say, the persons pumping were under no obligation to maintain the underground water level at such a height as that the stream would not percolate through its bed; but only not to so lower the underground water level that the water from the stream was withdrawn and reached their pumps. This was the view taken by the present Lord Chief Justice in the case of English *v.* The Metropolitan Water Board. This case was particularly interesting, owing to the exhaustive discussion it contained of the effect of pumping in a chalk area.

The authors then considered the case at some length. Proceeding, they said: "This, then, we have arrived at—that there is an inherent right in every landowner to take the water underneath his land, and that with this right necessarily goes a power to injure his neighbours, under the protection of the law—the magnitude of the injury, and the bounds of its action, being solely limited by the scientific apparatus at the disposal of the landowner. In the case of the ordinary landowner, however, there is no inducement to lead him to make more than a moderate use of his right. Even if he were to obtain an enormous quantity of water, he has no means of disposing of it. Moreover, it rarely happens that the water is removed from the watershed to which it belongs, and this fact reduces very greatly the injury it is possible his operations may cause, as, with a loss that is greater or less according to the purpose to which it is put, the water is returned to the river it would naturally feed. Before water can be conveyed any distance away from the site upon which it is found, it is necessary to lay continuous lengths of mains, and this immediately brings the landowner face to face with his neighbours and the local authorities whose interests are affected, and compulsory powers have to be sought. But while it may be necessary to subject A to some disadvantage in order that B may have the proper use and enjoyment of his land, it is quite another thing to enable B to injure A indefinitely and without compensation for the benefit of an unlimited and possibly distant class of third parties. Thus it is that the case of water companies and similar bodies whose object it is to obtain large quantities of water for distribution, is wholly different from that of the ordinary landowner. Their one purpose is the exploitation of the right which, even in private hands, works at times some hardships, and they are created with special facilities for this, such as no ordinary landowner can possess.

A possibility that the ordinary law should be modified in dealing with large distributing agencies was suggested by Lord Wensleydale in giving his judgment in the House of

Lords in the historic case of Chasemore *v.* Richards. It will be remembered that in that case the Local Board of Health of Croydon sank a well within a quarter of a mile of one of the springs of the River Wandle, and pumped therefrom half a million gallons a day for the supply of the town. Some of this water would otherwise have reached the river. The owner of a mill upon the river brought an action against the Board for the loss of this water. It is worth noting that in the statement of facts the water is described as percolating through the strata in constantly shifting courses rather than running in definite fissures, though probably the latter view would now be upheld. It was decided that the mill-owner had no right to the uninterrupted flow of the underground water on its way to the river, and that the Board were acting within their rights.

"The question in this case," said Lord Wensleydale at the close of his judgment, "as it seems to me, resolves itself into an inquiry whether the defendant exercised his right of enjoying the subterraneous waters in a reasonable manner. Had he made the well and used the steam-engines for the supply of water for the use of his own property and those living on it, there would have been no question. If the number of houses upon it had increased to any extent, and the quantity of water for the families dwelling on the property had been proportionately augmented, there could have been no just grounds of complaint; but I doubt very greatly the legality of the defendant's acts in abstracting water for the use of a large district in the neighbourhood unconnected with his own estate, for the use of those who have no right to take it directly themselves, and to the injury of those neighbouring proprietors who have an equal right with themselves. The same objection would not apply to the abstraction of water for the use of the dwellers on the defendant's land, even though they carried on trades requiring more water (breweries, for example) than would be used for mere domestic purposes. It would still be for their purposes only. But in this case there has been an abstraction of water for purposes wholly unconnected with the enjoyment of the defendant's land."

After expressing these doubts, Lord Wensleydale acquiesced in the decision of the majority of the Law Lords. His judgment is quoted, not as showing that there is any question as to the law on the point—that has been finally decided—but to indicate that the consequences of the law have been recognised as possibly inequitable."

The authors then referred at some length to the way the difficulties are dealt with in America. In the American courts the English common law is administered as developed in that country, and English cases are quoted.

The effect of extensive pumping was then considered. Considering first the effect of drawing upon the water which had collected in the lower strata below the level of any natural outlet, the theory was constantly advanced that with an inexhaustible supply to draw upon no injury could ensue from the most powerful pumping. This theory, in the authors' opinion, could not be supported by the evidence of experience. The case of English *v.* Metropolitan Water Board was also a striking instance of deep-level pumping affecting the upper subsoil water. There could be no doubt that in such cases springs and wells were affected, not only in the vicinity of the deep well, but sometimes at long distances away, the support afforded by the deeper water being withdrawn during the period of pumping.

"The effect of heavy pumping," it was stated, "from the moving body of underground water is upon the wells and springs below, and not to any great extent upon those above the point of pumping; unless, of course, it is attempted to obtain more water than the gathering ground will supply. It is, therefore, of importance to know the direction in which the underground water is moving, because disastrous results may be expected to follow from heavy pumping operations carried on up-stream of the natural outlets. This applies more especially to the chalk and similar formations, where the water gathered from large areas has already collected in considerable volume, and is moving along through fissures. By pumping on the line of flow in such a district water can be abstracted in much greater quantities than when it is moving dispersedly through pervious strata, and the wells and springs which it should have fed can in some cases be wholly deprived of it. Thus it comes that a river rising from the chalk is vastly more assailable than a river the immediate product of surface drainage, and fed therefore by innumerable small tributaries, or by water oozing directly into it through the banks. In the case of the chalk stream all its eggs are, so to speak, in one basket; and that basket lies at the mercy of the enemy, and knows no protection from the law. In fact, the water which will later be the river is already collected underground, though not in such known courses as the law will acknowledge, and by a single lucky boring half the flow of the river may be stopped."

The authors then dealt with the protective provisions in private Acts, and the Sutton District Waterworks Act, 1906; and in reference to the last case they concluded by saying:—

"In this case Parliament went a long way towards laying down the principle that, while practically no restriction is placed by the law upon the use of underground water by an ordinary landowner, yet the use of this water by a body created with peculiar facilities for taking away large quantities comes under a different category, and in such a case the other persons in the locality require protection, whether, as in this case, by limiting the operations of the body in question, or, as in the case of bodies whose object is the abstraction of water, by granting compensation to persons affected.

And the authors submit that such is the right principle. The onus would, of course, be upon the persons injured to show that their injury was the result of the operations of the water company or similar body, and it would probably only be in cases of real hardship that this could be proved. But the right to attempt to do so should not, it is submitted, depend upon the chance opposition of a Bill before a Committee of Parliament at great expense, but should be a right assured to every person who may be affected before the Bill creating the water-abstracting body is passed. Whether that right would be best secured by an amendment of the Waterworks Clauses Act, or by some other means, the time has not yet come even to suggest. It is enough for the moment to get the wrong acknowledged."

A discussion followed the reading of the paper.

THE SANITARY INSPECTORS' ASSOCIATION:

TEMPERATURE OBSERVATIONS FROM A SANITARY POINT OF VIEW.

A MEETING of the Sanitary Inspectors' Association (South-Eastern Centre) was held on Saturday last week at Carpenters' Hall, London-wall, E.C., when Mr. Baldwin Latham, M.Inst.S.E., President of the Centre, delivered his Presidential address, the subject being, "The Importance of Temperature Observations from a Sanitary Point of View." He said that there could be no doubt of the importance of temperature observations being made, on the air, the earth, and water, as a means of affording a clue to the conditions which lead to the propagation of some diseases which recur at certain seasons. There were diseases which follow the seasons with perfect regularity that cannot be accounted for by infection or contagion. It was well known that a low temperature stopped decomposition, hence the art of preserving meat in a fresh state. Milk could be preserved fresh if it was at once cooled down and kept at a low temperature. The effect of high temperature was the destruction of germs; dry heat, however, for this purpose, was not so certain as moist heat; the effect of boiling, if sufficiently prolonged, was known to be destructive to germs. Sewage would not decompose at temperatures below 50 deg. Fahr. Sewers began to be offensive when the summer temperature descends into the earth to their level and heats up the sewage then flowing through a warm channel. Cold spring water entering a sewer by leakage renders such sewer sweet which otherwise might be most offensive. High temperatures favoured the growth of low forms of vegetable and animal life in water. When sewage was applied to land for the purpose of purification temperature led to the evaporation of pure water from the sewage and to the concentration of impurities in sewage effluents which had been passed over land. This influence was very considerable, and had been entirely overlooked by all the various Royal Commissions that had reported upon the purification of sewage by its application to land. Freezing also had the same effect on effluents, as it was only the pure water that freezes, and the effect of a frost, therefore, was to lock up on the land for the time being a large amount of pure water. Consequently, concentrated effluents due to freezing had been taken for imperfect purification in the time of frost; however, if anyone followed the analyses they would see that the moment a thaw set in, and the pure water which had been locked up in the form of ice on the surface of the ground was set free, the effluents were shown to be more than usually pure at such times. The study of temperature was also of very considerable importance with regard to constructive sanitary works, such as, for example, water mains and sewers. A water main laid with 2 ft. 6 in. cover might undergo in the course of a season a variation of temperature of 30 deg., due to the temperature of the ground, which would make a difference of several inches in length in a mile of water main, showing how important it was to make provision for this contraction and expansion taking place through the influence of heat and cold. The effect of temperature upon sewers and house drains was also very considerable. At times there might be melted snow going down the house drains, at another period boiling water, which would in time destroy any rigid joint of a house drain, so that it was impossible to maintain house drains watertight for any length of time when constructed of materials such as were usually employed. Moreover, increase of temperature of the air within the sewers was capable of creating a force which no traps could possibly withstand.

For upwards of thirty years the author had carried on daily observations at Croydon upon the temperature of the atmosphere, the ground, and the public water supply. Temperature had a considerable variation throughout the year, both in respect to air, earth, and water. Of course, we knew from observations that there is a very considerable difference in temperature between one period of the year and another, but many might not be so well conversant with the temperatures which took place in the ground and in the water we drink, and what the effect of temperature might be in promoting or destroying the cause of disease. In this country the air temperature in the month of July was on the average the highest, and if we compared the average temperature of the ground at various depths—namely, from 2 ft. 6 in. to 50 ft.—we found that the ground as a rule was 1 deg. warmer, on the average of the year, than the atmosphere, the mean atmospheric temperature at Croydon for thirty years being 49·5 deg., and the mean temperature of the ground being about 50·5 deg. at all the above depths; but the variation of temperature, both of the air and ground, was very considerable, and the period of the year when the maximum ground temperature occurred also varied at different depths; on the average at 2 ft. 6 in. in depth the highest temperature occurred in the month of August, at 5 ft. also in August, at 10 ft. in September, at 20 ft. in November, at 30 ft. in December and January, and at 40 ft. in April. The highest average monthly air temperature was 62·8 deg. in July, and the lowest average monthly temperature 38·2 deg. in January; but temperatures in different years and for less than a month might vary considerably from the average. The temperature of the ground in different countries varied enormously. The average temperature at Croydon for the month of May is 53 deg., and for June 59·5 deg., the month of June being invariably the healthiest month of the year. The average temperature of the ground at 5 ft. in the month of June was 55 deg.,

at 10 ft. 50·5 deg., at 20 ft. 48·9 deg., and at 30 ft. 49·7 deg. The temperature of the ground had been taken in 2-in. iron tubes, a separate tube and separate instrument being used for each depth, and means were originally taken for preventing convection currents, but ultimately it was found it was not necessary to take such precautions, as no convection currents occurred in these small tubes, and that the same temperature could be got by stringing together a set of instruments in a deep tube as in separate tubes at different depths. The instruments used required to be slow in action, and were enclosed in a glass tube, the bulb being surrounded either by stearine or cork dust, so that the instruments could be withdrawn from a considerable depth and the temperature read without a change taking place. It was very important, in cases of water supply in judging of the quality of the water taken from a well, that such instruments should be used as would be capable of measuring the finest distinction in temperature owing to the small variation which might take place when water came from some considerable depth, but which would indicate that there was water passing in from the surface, because deep water, unmixed with surface water would, as a general rule, have no change of temperature. The most unhealthy month of the year, so far as influenced by temperature, was the month of August. Of course, there were other unhealthy months when the period of percolation first commenced, when impurities got washed out of the ground into the water supplies, or were driven out of the ground by the rain entering it. The unhealthy season depended often on the prior conditions of drought; long drought before percolation commenced ushered in an unhealthy period. Drought in summer was combined, as a rule, with excessive heat, while drought in winter was accompanied with cold. Cold in summer and warmth in winter were a prelude to a healthy season, though both of them were usually very disagreeable. Exhalation from the ground followed the law of evaporation. When the ground was very warm and polluted dangerous exhalations took place at those periods of the year when the air had a capacity for receiving them. The greatest amount of exhalation took place when we had the maximum temperature of the ground and the minimum temperature of the dew point. During the plague in this country there were records of how people escaped by shutting themselves up in their houses and keeping good fires burning all the time. In what way a fire would act as a preventive of plague or other disease had been made a direct experiment by the author. Anything which would raise the temperature of the dew point of the air to such an extent that it was above the temperature of the ground not only stopped evaporation, but, on the other hand, produced condensation, so that there was no liability of any escape of exhalations from the soil; so that when the dew point in the house was in excess of the dew point outside or under the house there would be condensation, and the effect would be the prevention of dangerous emanations from the soil under the house. It had been shown in the investigation of distribution of deaths from plague that those persons who live on the ground floors of houses were much more susceptible to the disease, which was much more fatal amongst them than amongst those who occupy floors removed a considerable distance from the ground. It was also known that those who, in the time of the great plague, of whom there were many thousands, were moored on shipboard in the Thames escaped the plague through there being no ground beneath them for the propagation of the poison, and it was also asserted in the annals of London Bridge that the plague was never prevalent among those residing in houses on that bridge.

The temperature of water supplies was also a matter of very considerable sanitary importance. How often did we hear of the advantages of spring water as a source of supply because it was cold in summer and warm in winter? This was true when the water had been distributed through miles of water mains, when the temperature of the water became the temperature of the ground at the depths at which the mains were laid, very slightly modified by the temperature at the source when the distance the water was conveyed was but short. The temperature of water supplies had no doubt a very considerable influence on public health. The temperatures which had been taken, at the author's office, of a cistern supply had occasionally exceeded 70 deg., and had varied from 71·5 deg., the average of the month of July, to about 42·5 deg., the average of the month of January. Water formed the staple part of the food of all hand-fed children, and, as a rule, was taken in its raw state. If all water given to infants was boiled before being mixed with their food it would tend to a considerable diminution in the deaths due to diarrhœa among hand-fed children.

A sanitary inspector should be a meteorological observer, and have under his control for observing a complete set of meteorological instruments, from the observation of which he might know what was likely to occur in his district.

A discussion followed, in which Messrs. W. W. West (who proposed a vote of thanks to the President, which was heartily agreed to), S. C. Legg, and A. G. Duck took part, and the President, having replied, the meeting terminated.

SUFFOLK INSTITUTE OF ARCHÆOLOGY.

THE annual meeting of the Institute was held at Bury St. Edmund's on the 3rd inst., Sir William Gordon, President, in the chair.

The Rev. E. Farrer drew attention to the removal of a stained-glass window from Coddenham Church, and a resolution was passed condemning the proceeding. It was agreed that the first summer excursion in August should embrace a visit to Southelmmam, Mettingham, and Buxton, while the second should take place in West Suffolk.

In accordance with a resolution adopted at the last annual meeting, the Secretary said he had communicated with the incumbents of every parish in Suffolk, asking if they would be willing to copy, or get copied, all the monumental and gravestone inscriptions, both inside the church and in the churchyard, and sent to the Institute for preservation in the library. Only fifteen replies had been received.

A motion appeared in the name of Miss Layard to the effect that a grant of 5*l.* be made towards the expense of excavating the Anglo-Saxon cemetery at Ipswich. The resolution was thereupon agreed to.

Rev. G. H. Butler suggested that the Institution should ask Suffolk incumbents having a parish magazine to insert notes concerning the history of the parish. If the incumbents sent a copy of these notes to the Institute Secretary at the end of each year, valuable materials would be collected for the making of local and county history. In proposing a resolution on these lines, the reverend gentleman said the society ought to become more of an educational power, and if this idea was carried out, then such a thing might be accomplished. After discussion, it was agreed that it would be best first of all to ascertain whether those clergy who were members of the society would undertake to do what was asked.

Architectural Societies.

NORTHERN ARCHITECTURAL ASSOCIATION.—The annual report of the Northern Architectural Association states that during the session and since the last annual report (March 7, 1906) seven members, thirteen Associates, and fifteen students have been elected, as compared with two members, nine Associates, and fourteen students for the previous twelve months, and the roll stands as follows:—

	1906.	1905.
Members	80	77
Associates	84	76
Students	86	80
Total	250	233

The above numbers show that the Association is now the largest society allied with the Royal Institute of British Architects.

THE ROYAL INSTITUTE OF THE ARCHITECTS OF IRELAND.—The usual monthly Council meeting of the Royal Institute of Architects of Ireland was held at 20, Lincoln-place, Dublin, on the 8th inst. In the unavoidable absence of the President, Mr. A. E. Murray was moved to the chair. Letters from members of the Institute with reference to the action of local councils in connexion with the Labourers Acts were before the Council. The Hon. Secretary was instructed to write giving an account of the action taken by the Council in the matter. The Hon. Secretary was also instructed to write to the secretary of the unemployed committee of the Stonecutters' Union with reference to a communication received from the committee regretting that any differences with regard to conditions of contract should interfere with the execution of building work, and to express a hope that any misunderstandings will be speedily removed. It was decided to call a special Council meeting to consider the education scheme drawn up by the Architectural Association of Ireland.

Engineering Societies.

THE JUNIOR INSTITUTION OF ENGINEERS.—By permission of the Chief Engineer to the Metropolitan Water Board, Mr. William B. Bryan, President of the Institution, the members recently paid a visit to the works in course of execution for the Fortis Green reservoir, which forms part of the Board's Staines reservoirs communication works. Under the guidance of Mr. Joseph Francis, by whom the reservoir was designed, and under whose supervision it is being constructed, and of Mr. James Byrom, the contractor, the party were shown over. This reservoir forms the terminal of a line of pumping main through which the Thames water is to be pumped for the supply of the New River district. The water will be drawn from the river at Staines, and will pass along an open aqueduct to Kempton Park, where, after subsidence and filtration, it will be pumped through a 42-in. diameter main to Cricklewood, a distance of thirteen and a half miles. There it will be again pumped through a 42-in. diameter main to the Fortis Green reservoir, a further distance of three and a half miles. A line of 30-in. diameter gravitation main will convey the water from the reservoir to the distributing mains of the New River district at Hornsey. The capacity of the reservoir will be 10,000,000 gallons, and its depth 17 ft. A central division wall, extending up to a level of 6 ft. below the top water line, will divide the reservoir below that level into two equal parts. The floor will be of concrete, the walls and piers of brickwork, and the roof of brick arching with concrete filling to the spandrils and covered with asphalt. The structure rests upon a thick bed of the London clay, and is made watertight by a wall of clay puddle extending all round the outside of the walls and carried well into the clay below. The whole will be covered over with earth, thoroughly well drained, and the top and slopes of the embankments will be turfed. The floors have a fall towards the southern end, along which a drain channel will be formed with an emptying pipe for clearing the reservoir when necessary. For convenience of sweeping out, there is in the floor between adjoining bays of arching a brick partition of a few inches in height. To prevent mischief in cases of overpumping, an Appold's overflow is provided. This ensures that as soon as the water has risen to a certain height above the lip of the overflow, the surplus shall be very quickly drawn down by syphonic action to the proper level. The sides of the trenches that have been excavated for the main walls, and which are 21 ft. in width, are supported by means of horizontal timbers, 11 in. by 3 in., held up in sets of four by vertical walings, 12 in. by 6 in., kept apart by struts, 12 in. by 6 in. By this method the face of the clay is firmly retained in place, and has no opportunity of being affected by external moisture. Considerable lengths of 42-in. and 48-in. diameter brick culverts have to be constructed to carry the surface drainage, which now traverses the site by means of ditches.

THE SOCIETY OF ENGINEERS.—At a meeting of the Society of Engineers held at the Royal United Service Institution, Whitehall, on the 8th inst., Mr. J. W. Wilson, Vice-President,

in the chair, a paper was read on "The Renard and Sourcouf Road-Train System" by Mr. B. H. Thwaite, Assoc.M.Inst.C.E., and Mr. R. F. Thorp, M.Inst.C.E., and of which the following is an abstract:—The authors first traced the evolution of the mechanical road transport system from its practical introduction in 1820-1840 by Gurney, Handcock, and Napier. They then showed that motor-coach steam-driven services were established by Dance in 1840, before the main railway Acts were passed. They stated that the steam motor-coach was in common use in London for several years—1830 to 1845—and they paid a high tribute to the pioneer work of Handcock. According to the authors, the success of Stephenson's railways and the railway boom of the forties in their combined effect suppressed all interest in the road motor-coaches, just as they did in the case of stage-coaches. But the event that was responsible for completely paralysing any efforts to emulate German and French progress in perfecting the mechanical road motor transport system was the Red Flag Act of 1865. The authors pointed out the disastrous consequences of repressive legislation in the development of British motor construction enterprise. They inferred that the disastrous effects could be readily demonstrated by the fact that most of the hundreds of London motor-'buses were German made, and that for the twenty years ending 1896 it was impossible to take advantage in England of the untrammelled progress of Continental inventors. The authors paid a well-merited tribute to the work of a band of energetic British workers, who, after strenuous and persistent efforts, succeeded in 1896 in removing the obnoxious Red Flag Act, the result being that the introduction at a fair running speed of the road motor-car was assured. The authors described the various phases of technical transition which had gradually led to the present perfection in motor design, analysing the running costs and showing in what direction reductions might be looked for. Reference was made to the hurried development of the motor-omnibus, and the authors quoted the figures representing their carrying capacities, 185 millions of passengers having been carried last year in London alone. The question of road maintenance was then considered, and it was suggested that if tolls were re-established the rates should depend upon the damage done to the roads by different types of motors. The authors then described in detail the motor road-train invented by Colonel Renard. The mechanical and economic *raison d'être* of this new system of transport was explained, and figures of running cost were given. Its value for agricultural and mining districts was pointed out, and its excellent power transmission, steering, braking, and steep gradient mounting qualities explained, the authors expressing very strong opinions with regard to its capabilities and the possibilities of its application.

THE HOUSING QUESTION AT KINGSTON-ON-THAMES.

THE Medical Officer of Health of Kingston-on-Thames, in his annual report which has just been issued, says that with regard to the Housing of Working Classes Act no action had been taken during the year. Several small blocks of houses had been put into tenantable repair, but such work is only makeshift. Houses of this class in most cases want to be pulled down and rebuilt, though in some instances a thorough overhaul might suffice. Owners of properties get out of their liabilities on one of two grounds, either they know the law very thoroughly and frighten the authorities by raising technical points or they raise commiseration by pleading poverty. The medical officer goes on to draw attention to the scheme he had outlined for the Cambridge-road area, and proceeded to say that there are certain small areas which might be dealt with—two groups of about ten or twelve houses, each abutting on the Fairfield, and small lots of houses in Shortlands-road and Cowleaze-road. A street cut through from Richmond-road to Lower Ham-road would get rid of a lot of old property hardly fit for people to live in if consumption is to be prevented. In another portion of his report dealing with consumption the medical officer writes that practically every house in Kingston which has not been built under the modern by-laws, or has not been improved up to the standard of those bylaws, is insanitary. He should like to be given the power to paint a large mark in yellow paint on the wall of every house where the landlord after due warning did not bring the house up to the proper standard. Under present conditions before a house can be improved it is necessary to prove a nuisance, and as tenants who are not consumption proof usually move from these insanitary houses before the disease is well developed the proof is very difficult. In a further part of his report dealing with scarlet fever the Medical Officer of Health refers to one case where the patient was sent to hospital under the special circumstances that he lived in a flat where four tenements opened on to the same porch. The building of rows of flats with the front door of each set of flats opening on to one porch is a most objectionable arrangement. These houses have to be drained to a common drain in a passage at the back, and this has obvious disadvantages. Drains can easily be carried under a house if good workmanship and first-rate materials are used. Possibly the extra expense necessary might induce the speculators to build semi-detached houses, each flat with a separate entrance. If the former class of dwelling makes much increase in the borough it would be found that the provision of isolation hospital accommodation would become very urgent. With the usual conditions prevailing in this town of one family with children and lodgers of adult age, isolation has been fairly easy to arrange in the homes with accommodation at Croydon for special cases; but if flats with practically four families in one house and six-roomed cottages are let to two families with children epidemics will be almost impossible to cope with. This tendency to overcrowding is due to a rise in the rents of old houses let on weekly tenancies to working-class families. This rise amounts in some cases to as much as 2s. a week, and brings up the rents of old property almost to the level of the new. The tenant consequently is obliged to take lodgers to make up the difference in his rent, and the borough had to pay for more patients at the isolation hospital from overcrowded tenements.

Fifty Years Ago.

FROM THE *Builder* OF APRIL 11, 1857.

DISCOUNTS TO ARCHITECTS.

INCLOSED herewith is a circular from an ironmonger of extensive business, headed "Circular for Architects only," and offering them 10 per cent. discount on the prices of the articles. I think it would have been more appropriately called a "Circular for *Thieves* only." Surely the tradesman who issued it is ignorant of the obligations of architects; or is it that his principal customers are some low class in our profession which systematically defrauds an employer by certifying for payment of upwards of 11 per cent. extra upon the real value of works, in order to enable the tradesman to pay 10 per cent. to him, the very person on whom reliance is placed for seeing that only fair prices are paid?

It is right in the face of this imposture that the public should know that every Fellow of the Institute of Architects has subscribed a pledge, "that he will not receive any pecuniary consideration or emolument from any builder or other tradesman whose works he may be engaged to superintend," and I believe that this is generally recognised as a principle by respectable architects. F.I.B.A.

*** We have received nine other letters enclosing the same "circular," with similar comments.

*** It is somewhat exasperating to reflect that this kind of thing, against which we published this plain-spoken protest fifty years ago, is at the present moment as rampant as ever—or more so.—ED.

Illustrations.

PROPOSED COUNTY HALL AND BRIDGE OVER THE THAMES.

THIS drawing, by Mr. E. W. Twining, which was exhibited at the last Royal Academy, is the architectural expression of a scheme proposed by Mr. A. R. Bennett, of the Institution of Electrical Engineers, for a new bridge over the Thames a little east of Waterloo Bridge; the approach road on the north side of the river commencing from opposite the flank of St. Clement Dane's church, and the continuation on the south side forming a new road cutting into Waterloo Bridge-road nearly half a mile from the south end of Waterloo Bridge.

As a street route, and as a means of relieving the traffic of Waterloo Bridge, the scheme has a good deal to recommend it; but the proposal to erect the County Hall as a long narrow building carried on arches on this bridge, though evoking our sympathy in an architectural sense, is of course perfectly out of the question in a practical sense. No form of plan could be worse or more inconvenient for the inner working of a great collection of offices.

But the idea in itself of a group of buildings along a Thames bridge is quite worth attention, and might have a very fine effect, provided that they were buildings for which such a position would not be practically inconvenient. We have pleasure in publishing Mr. Twining's drawing, therefore, as a fine suggestion of this kind; only it must be understood that we publish it, as no doubt the Academy hung it, as an architectural conception or suggestion, and not as presenting a scheme which could ever have been seriously entertained for the London County Hall.

TWO COUNTRY CHURCHES.

THE little church at Southwick, a district of North Bradley, near Trowbridge, has been built of brick, faced on the outside with rubble masonry and with Bradford stone dressings. The roofs are tiled and the spirelet is covered with oak shingles. As will be seen from the plan, the tower forms the porch leading into the baptistery, on the opposite side of which is the vestry. The nave and chancel are under a continuous roof (the timbers of which are painted red and black), divided only by a somewhat rich oak screen; there is a recess for the organ on the north of the chancel. In the baptistery, in addition to the ordinary font, is one sunk in the floor to meet a local wish for baptism by immersion. The works were well carried out by Messrs. Jacob Long & Sons, of Bath.

The other church, now being erected by Messrs. Hoskings Brothers, contractors, Newbury, on a fine site in the park of the ancient family of Bankes, of Corfe Castle and Kingston Lacy, near Wimborne, has been designed to meet quite different conditions. Here the tower in the centre of the west end forms the family pew, with its separate entrance, and with shields bearing the coats of the family from 1618 in the west window. A stone arch divides the nave from the chancel; the plan is cruciform, the vestry, with organ loft over, being on the north and the children's transept on the south. The walls are faced with coursed Purbeck rubble masonry with a mixture of red sandstone, and the dressings are of Corsham Ridge stone; the roofs of the tower and porches are covered with old stone tiles from the estate, the remainder with dark red tiles from Bishop's Waltham. The roofs are constructed from fine oak timber grown at Kingston Lacy.

The south window of the chancel, over the sedilia, is filled with stained-glass by Mr. Horace Wilkinson representing the patron saint S. Stephen; this window is the gift of the estate agent. The font is in alabaster, and presented by the tenants of the estate, both features being memorials of the late Walter Ralph Bankes, under whose will the church is founded.

The oak lectern (also presented by a private donor) and the pulpit, as well as the font, are worked by Mr. Herbert Read, of Exeter. The hot-water apparatus was installed by Mr. Rendell, of Devizes, and the electric light by Messrs. Cooper, of Bournemouth.

A churchyard cross in memory of the founder is being erected southward of the tower, central with the fine avenue which leads up to the church.

The drawings were exhibited in the Royal Academy last year. C. E. PONTING, F.S.A.

SOUTH TRANSEPT, CANTERBURY.

THIS is a sketch of the South transept to the nave of Canterbury Cathedral, by Mr. J. W. Hepburn, some of whose smaller sketches we published a few weeks ago.

Though we cannot congratulate the author on his trees (architectural draughtsmen of late years seem to be very easily satisfied in the matter of trees), the drawing of the architecture, which is the real subject, is a fine bold piece of pen-line work in a free and broad style.

Builders' and Contractors' Column.

HYDRAULIC TREPAN FOR DEEP BORINGS.

A new form of trepan recently introduced in Germany is specially adapted for driving deep boreholes through hard strata, being operated by hydraulic power and provided with a movable weight by which from fifty to sixty blows can be struck per minute.

The apparatus consists essentially of two parts, one being mounted upon the shaft or rod and capable of longitudinal movement relatively to the latter, and the other part constituting the trepan proper entirely independent of the rod, but capable of being coupled with it, as described below.

To enable the reader to understand its construction we give in the accompanying illustration a longitudinal and three cross-sections of the appliance.

The trepan is a tube *a* having the same diameter as that of the hole to be bored, and fitted at its base with the shoe *b*, finished with the cutting edge b^1 passing from side to side of the tube. Above the shoe is the ring *c*, and at the top of the tube is another ring c^1, both of these rings projecting slightly from the interior surface of the tube.

The rod *d* is hollow, and serves to convey water under pressure to the moving parts suspended from its lower end. These parts are attached to a hydraulic cylinder formed by two tubes, *e* and *f*, the end of the rod *d* fitting into the tube *e*, and the end of the tube *f* into the end of the rod *d*. The cylinder is divided by a watertight ring, *g*, into two compartments, *h* and h^1, each entirely closed, and the ends of which act as pistons. The compartment h^1 is always in communication with the interior of the tube *d* by the hole *j*, while the compartment *h* can be placed in communication with the interior *d*, or be insolated from it by a piston valve of special construction.

The valve consists of a double-acting piston *k*, formed by two discs, *l* and *m*, of different diameter, each moving in a cylinder and attached to a common spindle. The piston is operated by the lever *n*, and controls a second piston *o* of similar construction. The piston *k* serves to place the lower cylinder *p* of the piston *o* in communication with the water in *d* by the passages *q* and *r*, or with the exterior by the passage *r*. Similarly the piston *o* serves to establish communication between the compartment *h* and the tube *d* by the passage *s* and the upper cylinder of *o*, or between the compartment *h* and the exterior by the passage *s* and the opening *t*.

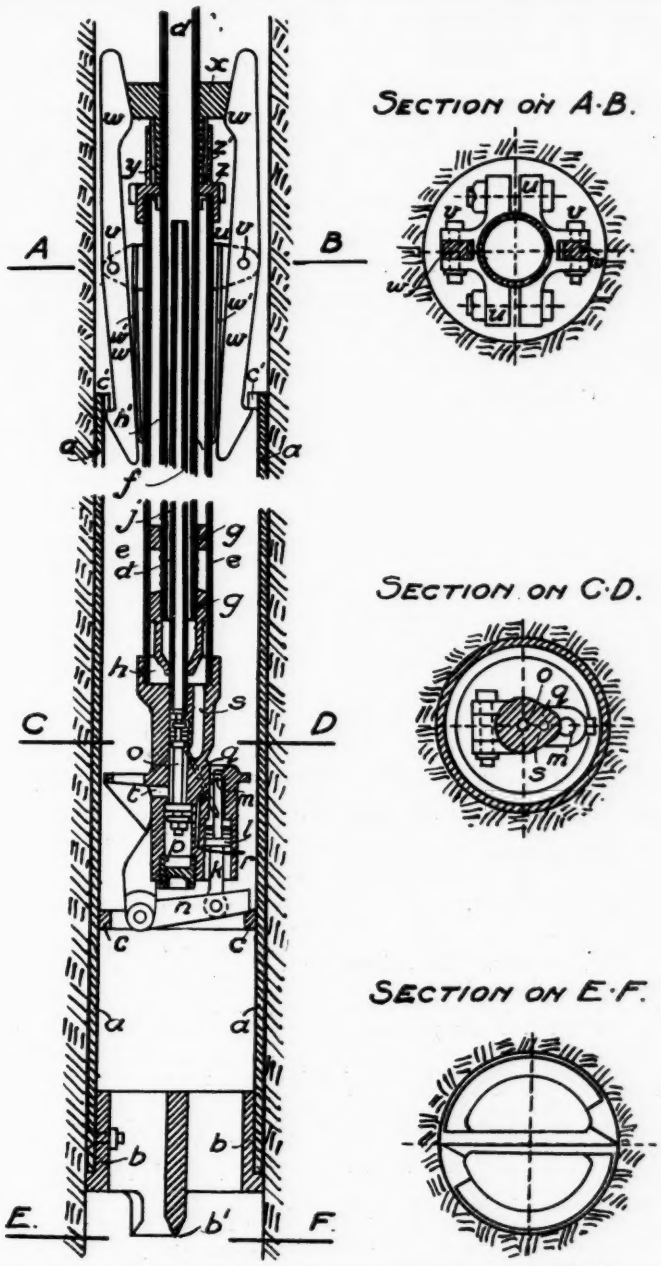
At the upper end of the tube *e* is a sleeve *u* with two projecting lugs carrying the axes *v*, about which turn the levers *w*, whose springs w^1 tend to keep the hooded ends apart.

The tube *d* is fitted with the tapered collar *x*, with which the upper arm of the levers *w* can come into contact, and which is prolonged by a sleeve *y*, screwed outside with threads of very wide pitch. Upon the sleeve *y* is fitted the socket z^1, projecting above the head *z* of the tube *e*, this socket being tapped with threads corresponding with those on the outside of the sleeve *y*.

When the shell *a* is coupled with the rod *d* the hooked ends of the levers *w* engage the ring c^1. But if the shell be raised slightly the heads of the levers come into contact with the tapered collar *x*, with the result that the lower ends of the levers are released from the ring c^1, the shell *a* and the mechanism it contains being then free to fall. But while connexion is maintained between the shell and the rod *d* the lever *n* rests upon the ring *c*, and keeps the piston *k* at the upper end of its cylinder, as shown in the drawing, thus establishing communication between *d* and *p* by means of the passages *q* and *r*. Then water flowing from *d* raises the double-acting piston *o*, which in turn establishes communication through the passage *s*, between the compartment *h* and the exterior, so that the end *h* of the cylinder *e* is not under pressure. Therefore, the upper end of the cylinder *e*, being only subject to the pressure of water entering by the opening *j* in the compartment h^1, the cylinder *e* moves upwards along the rod *d*, and as soon as it has arrived at the limit of its course and the shell *a* has fallen after its release from *w* the piston *k* is depressed by the weight of the lever *n*. The descent of *k* places the conduit *r* and the space *p* in connexion with the exterior, so that the double-acting piston *o*, being no longer held up by the pressure formerly existing in *p*, descends in turn owing to the pressure acting upon its upper surface. In falling it makes communication between the compartment *h* and the tube *d* through the passage *s*. Water proceeding from *d* then presses against the ends *h* and *z* of the cylinder *e*, and the cylinder is forced downwards along the rod *d*. Towards the end of its downward movement the cylinder comes to the position where the lower ends of the levers *w* engage with the ring c^1, the consequences being that the piston *k* is again raised, the various parts of the mechanism return to the positions occupied before the disengagement of the tube *a*, and the cylinder *e* rises upwards, carrying with it the tube, which is caught and held by the levers *w*.

The duty of the two screwed sleeves z^1 and *y* is to turn the trepan through an angle of about 40 deg. at each stroke.

Although the operations described appear to be somewhat complicated they follow in sequence quite automatically, and the completion of each cycle is so rapid that, as already stated, from fifty to sixty blows are given per minute. It is stated by the *Zeitschrift für Elektrotechnik*, to which we are indebted for the particulars here given, that a trepan of this kind capable of driving a hole of 6 in. diameter requires the hydraulic pressure of about 142 lb. per square inch. The operation of the apparatus requires two men, one to work the hydraulic pump and the other to lower and add extra lengths to the drill rod as the boring increases in depth.



THE CONTRACT QUESTION IN IRELAND.

The Royal Institute of the Architects of Ireland,
20, Lincoln-place, Dublin,
April 5, 1907.

DEAR SIR,—I have been instructed to send you the enclosed letter, which has been sent to the hon. sec. of the Master Builders' Association, Dublin.—Yours faithfully,

JAMES H. WEBB, Hon. Sec.

The Editor of the *Builder*.

"The Royal Institute of the Architects of Ireland
20, Lincoln-place, Dublin,
March 26, 1907.

DEAR SIR,—My Council have received the circular letter you have addressed to members of this Institute covering a copy of the opinion you Association has obtained from Mr. James H. Campbell, K.C., on the revised conditions of contract recently adopted by this Institute. My Council can only assume from the somewhat intemperate language in which Mr. Campbell expresses his opinion and the particular reference which he makes to clause 13, paragraph 2, of the revised conditions that he has not been made aware that that paragraph, so far from enunciating any new principle in building contracts, has been in all the printed conditions of contract in use by members of this Institute for the past forty years, and has hitherto been accepted without question by building contractors.

Mr. Campbell's objection that the retention of this paragraph unchanged in the revised conditions prevents recourse to litigation is not unnatural, but it is because the powers vested in the architect under this paragraph have been as a general rule exercised fairly and reasonably between all parties, with the result that litigation has been the exception rather than the rule throughout Ireland, that my Council decided to retain the paragraph in its present form, the

more particularly as the principle has been consistently approved by the judicial bench.

The conditions as revised contain no change in principle from those they have superseded. Such changes as have been made are for the most part verbal connexions except where the Council have endeavoured to meet certain grievances of which contractors had complained.—I am, yours faithfully,

JAMES H. WEBB,
Hon. Sec.

John Good, Esq.,
Hon. Secretary,
Master Builders' Association,
55, Great Brunswick-street, Dublin."

Copy of opinion of the Right Hon. James H. Campbell, K.C., M.P., on Form of Contract adopted by the Royal Institute of Architects of Ireland referred to in the foregoing letter :—

"In my opinion the scope and effect of the Form of Contract adopted by the Irish Architects is an outrage upon justice and common sense. The result of clause 13, paragraph 2, would be to leave the builders at the mercy of the architects upon every conceivable question, including the most serious matters of difficult and complicated law, except as to the quantities or prices of deviations duly ordered. In fact, this contract would oust altogether the jurisdiction of His Majesty's Courts of Law, and place querists outside of the pale of the law save in the very exceptional case in which they could prove fraud or misconduct on the part of the architect. Querists should resolutely decline to tender upon this form, and I feel certain that public opinion will endorse their action. The form adopted by the English architects, though stringent in many respects, still leaves to querists the opportunity for redress by arbitration or legal proceedings, and in this respect is in striking contrast to the Irish form, which would compel querists to submit to the decision of any architect upon every conceivable question, no matter how unreasonable or arbitrary that decision might be.

If querists were to submit to such proposal they would place themselves in a position of servitude such as no other community or interest would ever tolerate."

Competitions.

NEW COUNTY HALL, LONDON.—The following supplemental notes have been issued for addition to the conditions issued to competitors for designs for the New County Hall, London :—

"(*a*) Any further information required by competitors must be applied for to the assessors, and addressed to the County Hall, Spring Gardens, London, S.W., in the form of separate questions on or before Wednesday, the first day of May, 1907, after which date no further questions can be considered.

(*b*) Those questions which it is necessary to answer will be replied to, and the information supplied to all competitors; such replies will then form part of the conditions.

(*c*) For the immediate information of competitors the scale for the drawings for the preliminary competition has been definitely decided by the Council to be 16 ft. to an inch, and in view of the possibility of most of the competitors having considerably advanced their design no alteration in the scale can now be made."

FAILSWORTH PUBLIC LIBRARY.—Mr. G. H. Willoughby, F.R.I.B.A. of Manchester, has been called in by the Failsworth District Council to adjudicate on the fifty-four sets of competitive drawings submitted in connexion with this competition, and he has awarded the first place in order of merit to the set of drawings No. 18 "A"—the design of Messrs. Ernest Ogden and Percy C. Hoy, of Examiner Buildings, Strutt-street, Manchester. The assessor's report has been adopted by the District Council, and the design placed first in order of merit has been accepted. The premiums offered were 20*l*. and 10*l*. for the designs placed first and second in order of merit respectively, but on the recommendation of the assessor the District Council have decided to award premiums of 10*l* each to the undermentioned, namely :—Mr. Frank W. Mee, 32, Victoria-street, Manchester (No. 26 "A"); Mr. David Bird, Brazennose-street, Manchester (No. 2); and Messrs. Speir & Beavan, Borough Chambers, Cardiff, in respect of drawings marked (No. 21). The whole of the drawings and the assessor's report will be open for public inspection during office hours from Thursday, the 11th inst., to Monday, the 15th inst., both dates inclusive.

BOOK RECEIVED.

ARCHITECTURAL HYGIENE. By Banister F. Fletcher and H. Phillips Fletcher, Architects. Third Edition, revised. (Whittaker & Co. 5s.)

The Student's Column.

ELECTRIC LIGHTING AND HEATING.—XIV.

Alternating Current Motors — Induction Motor—Slip—Motors in Cascade—Commutator Motor—Repulsion Motor—Induction Commutator Motor—Transformation of Alternating to Direct Current—Rotary Converter.

INDUCTION MOTOR. — Faraday discovered that when a metal cube was placed in a rotating magnetic field the cube revolved in the same direction as the field. The reason for this rotation is that eddy currents are induced in the metal, and the reactive force between these currents and the field make the cube rotate. If the cube were perfectly free to move it would revolve with exactly the same speed as the field. In this case it is said to be in "synchronism" with the field, and there are no eddy currents induced in it. In practice a certain amount of work has to be performed in overcoming friction, and thus it rotates at a less speed than the field, the induced currents producing the required couple.

The rotation of the cube takes place in exactly the same way whether the rotating field be produced by fixed alternating current magnets or by revolving electromagnets, and hence in the early days of electric lighting many electricians experimented on this method of converting electrical into mechanical energy. In 1885 Professor Ferraris succeeded in getting an appreciable amount of mechanical power from a copper cylinder which he placed in a rotating magnetic field. This was the earliest induction motor, and the principle employed is identical with that of the action of Faraday's cube. The efficiency of this motor was, however, very low. To get a strong torque we must have large currents and a powerful field. The magnetic reluctance of the path of the magnetic flux must therefore be small, and so also must the electric resistance of the paths of the induced currents in the rotor.

In the ordinary induction motor the revolving part consists merely of a bundle of circular iron stampings clamped together and forming a cylinder. Through holes near the circumference of the cylinder run copper rods, the ends of which are fastened together by a metal ring. The function of the currents in the stator windings is primarily to produce a rotating magnetic field, and, as the air-gap can be made very minute, a powerful flux is produced.

Slip.—If the revolving magnetic field make n_1 revolutions per second, and the rotor make n_2 revolutions per second, the ratio $(n_1-n_2)/n_1$ is called the slip of the rotor. A knowledge of the value of the slip gives us important information about the working of the machine. If the value of the slip be s, the maximum possible value of the efficiency is 1—s. For instance, if n_1 were 10, and n_2 were 9, s would equal 0·1, and a superior limit to the ratio of the useful mechanical power obtained to the electrical power consumed would be 0·9, or 90 per cent. In practice a slip as great as 0·1 would only occur in the case of very small motors. For ordinary-sized motors the maximum value of the slip would only be about 0·06, and hence their speed only varies by about 5 per cent. between no load and full load. For most practical purposes, therefore, this type of motor may be considered a constant speed motor, as the speed practically only depends on the frequency of the supply current, and this is constant.

Motors in Cascade.—An ingenious method of getting two induction motors to run at half-speed and yet with high efficiency is to connect them in cascade. One of the motors must have a rotor wound with three coils, the ends of which are connected with metal rings fixed on the shaft, but insulated from it, called slip-rings. Carbon brushes press on these slip-rings, and are connected with the three stator terminals of the second machine. The axles of the two rotors are directly coupled together. When the stator terminals of the first machine are connected with the mains, the rotating field will induce an E.M.F. in its rotor windings, and hence induced currents will flow in it and in the stator windings of the second machine which will be working under normal conditions. At half-speed the frequency of the induced E.M.F.'s in the first rotor will be half the frequency of the applied E.M.F., and the second machine will be consequently running synchronously. We see, therefore, that the two machines when connected in cascade will run at a speed slightly less than half-speed. Considerable use is made of this method in electric railway systems worked by polyphase currents.

Commutator Motor.—The distinguishing characteristic of the commutator motors used in practice is that they can run at variable speeds. The armature of the ordinary direct current series motor rotates in the same direction whichever direction the current passes through it. The reason of this is clear when we remember that reversing the current also reverses the field, and thus, by Fleming's left-hand rule, we see that the torque is still in the same direction. To reverse the direction of rotation we must reverse either the current or the field, but not both. Since the torque is in the same direction whichever way the current flows, it follows that an ordinary direct current series motor will work with alternating currents. In practice, however, it works very badly, even with low frequency currents. This is due mainly to the eddy currents generated in the field magnets and the consequent excessive heating. In alternating current series motors the field magnets are built up of thin iron plates, the eddy currents are therefore negligible, and when certain precautions are taken they work satisfactorily.

The torque is a maximum at starting, and continually diminishes as the angular velocity increases. To a first approximation the torque is proportional to the square of the current. There is little fear, therefore, of the machine being pulled up by a temporary increase of the load, and there is much less risk of it being damaged by a temporary overload than in the case of the direct current machine.

The armature of the ordinary direct current

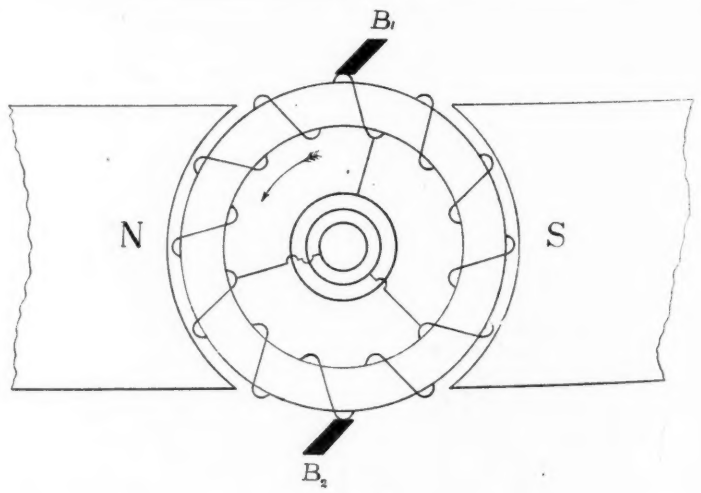


Fig. 26.

shunt motor also rotates in the same direction however it be connected with the mains, and hence it also runs on alternating current circuits. There are, however, very few alternating current motors of this type.

Repulsion Motor.—If we place a metal ring in front of an alternating current magnet the currents induced in it will tend to prevent any change of the flux linked with it. By replacing the ring by its equivalent magnetic shell we see that there will be repulsion between it and the magnet—poles of like sign facing one another. In general, if we place a copper ring in a strong alternating magnetic field, it will always tend to move to a place where the field is weaker, and at the same time tend to place itself so that as few of the magnetic lines as possible are linked with it. This is the principle utilised in the alternating current repulsion motor. By means of carbon brushes placed at certain points on the commutator of the rotor, some of the coils are short-circuited in places where the intensity of the field varies rapidly with the position of the coil. Hence currents are induced in the coils as they are successively short-circuited by the brushes, and powerful impulsive torques are given to the armature. As the coils are only traversed by intermittent currents, the average heating is much less than if they were always in circuit, and so smaller wires can be used. Small motors of this type are sometimes useful when a cheap variable speed motor is required.

Induction Commutator Motor.—If the brushes on the commutator of a repulsion motor be short circuited by a copper conductor, it will rotate in the opposite direction. The currents magnetise the rotor in such a way that it acts like a magnet with its axis inclined at an angle of 45 deg. to the field poles. There is, therefore, a powerful torque attracting the poles of the rotor. There is still, however, the weaker torque due to the repulsive action of the short-circuited coils acting, but this can be made negligible by connecting the windings with the commutator by means of strips of high resistance metal. As a rule these motors are much heavier than simple induction motors of equal output, and their power factor is low.

Transformation of Alternating to Direct Current.—Electricity can be generated very economically when the generating units are large and when the ratio of the average output of a station to the maximum output is high. This ratio is called the load factor of the station, and engineers are always devising methods of increasing its value. One method of doing this is to supply consumers whose demands for power are at different times, and do not overlap. It is found that the more diversified the load the higher, as a rule, is the load factor. It is now the customary practice to build a large station for generating electricity "in bulk" in some convenient site where land is cheap, water for condensing purposes abundant, and where the cost of coal is very little greater than at the pit-head owing to good transport facilities by water or rail. The electrical energy generated is transmitted in the form of three-phase high-pressure alternating currents to the distributing substations which are often many miles distant from the power-station. At these substations the energy has frequently to be converted into direct current to supply tramway systems or for lighting. With the direct currents generated accumulators can also be charged during the times of light load, the energy stored in them being given out during the times of heavy load, and so the load factor of the substation can be raised by their means. The conversion from alternating to direct may be effected by motor-generator sets. Instead, however, of having separate magnetic circuits for the alternating current motor and the direct current generator, we can design a machine to have one magnetic circuit only, by placing both the direct and alternating windings on one armature. The alternating current necessary to drive the armature can be led into it by means of slip-rings placed on the axle of the rotor, and the direct current supply can be obtained from a commutator on the same axle in the same way as in ordinary dynamos. We can simplify this arrangement still further by arranging that the alternating and direct currents flow in the same winding. Such a machine is called a rotary converter, and the principle of a three-phase machine of this type is illustrated in Fig. 26.

Rotary Converter.—The essential parts of a converter are the field magnets, the armature with its windings, which are arranged in a similar manner to those of a direct current motor (Fig. 26), the slip-rings with carbon brushes pressing on them, and the commutator also with carbon brushes. In a three-phase machine three of the commutator bars, at an angular distance apart of 120 deg., are connected with three slip-rings, mounted on the shaft, but insulated from it. The angular distance between the direct current brushes is 180 deg. Let us now suppose that E is the value of the direct voltage between the brushes on the commutator. Owing to the symmetrical method in which the coils are wound on the armature, if we represent the maximum voltage E between coils 180 deg. apart by AD (Fig. 27), the three

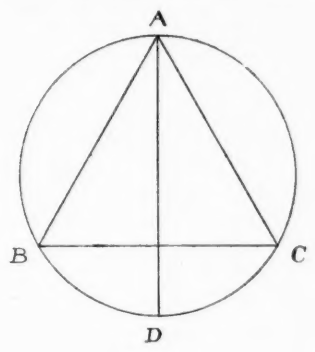


Fig. 27.

sides of the equilateral triangle ABC will represent the maximum values of the alternating voltages between the slip-rings. If V denote the voltmeter reading between a pair of slip-rings, V will be equal to

$$AB/\sqrt{2} = AD\ \sqrt{3}/(2\sqrt{2}) = E\sqrt{3}/(2\sqrt{2}),$$

and thus

$$\frac{V}{E} = \frac{\sqrt{3}}{2\sqrt{2}} = 0{\cdot}612.$$

We see, therefore, that the value of the voltage on the alternating current side is only 61 per cent. of its value on the direct current side, and this is the ratio which is found in practice.

Obituary.

MR. OSBORN.—We have to announce the death, on the 6th inst., in his sixty-seventh year, of Mr. Frank Barlow Osborn, of No. 12, Bennett's-hill and Edgbaston, Birmingham. Mr. Osborn was elected an Associate in 1864, and Fellow in 1872, of the Royal Institute of British Architects. Of his more important archtectural works we may mention the following:—The Joint Stock Bank, Birmingham (illustrated in the *Builder* of November 27, 1897, "Birmingham"—No. XI. of our series, "The Architecture of our Large Provincial Towns"); the Church Schools, Langley, Worcestershire; enlargement of Berwick Church, Shrewsbury (1894); Mission Church at Ashted, Warwickshire; new premises in Coventry for the London and Midland Bank (1896); alteration and enlargement of the Royal Institute for Deaf and Dumb Children, Edgbaston (1897); the new church in All Saints' parish, Birmingham, for the Churches Trustees Fund; the Crematorium at Sheldon Coppice, near Birmingham, built in 1903 at a total cost of 6,000*l.*; the tramway depot in Moseley-road; the electrical sub-station in Upper Trinity-street, Bordesley, for the Corporation; and the out-patients' department of the Birmingham Royal Orthopædic and Spinal Hospital in Great Charles-street, with dispensary and waiting hall, and on the upper floors two isolation wards, nurses' rooms, etc., after the Elizabethan style, as part of a scheme for the re-building of the old hospital. Mr. Osborn was architect (1901) of the new parish church of St. Peter, in St. George-street West, Springhill, designed after the Early Perpendicular style, for 750 sittings on the ground-floor level, and built at a cost of about 13,500*l* He was one of the six architects nominated in 1898 to compete for the New Lunatic Asylum, Birmingham; he was one of the twelve architects who were invited in that year to send in competitive designs for St. Agatha's Church at Sparkbrook, and was appointed assessor, five years ago, for the Birmingham Ear and Throat Hospital competition. In 1896 he carried out the renovation and redecoration of the interior of Holy Trinity Church, Bordesley. Of works by Messrs. Osborn & Reading we have illustrated the Edgbaston Assembly Rooms (November 27, 1897); Wesleyan Chapel and Schools, Corporation-street (December 18, 1896); and the Corporation Market buildings (April 17, 1886);. They were architects of the Conservative Club, and for the alteration and reparation of the Old Church, Birmingham, of All Saints', Kirkby Mallory, and many other churches in the neighbourhood.

MR. WILLIAM THEOBALD.—The death is announced of Mr. William Theobald, of Hillside, Needham Market, head of the firm of Messrs. Theobald & Sons, builders and contractors. The deceased was seventy-two years old.

MR. T. TELFORD.—Mr. Thomas Telford, builder, Langholm, died on the 3rd inst. Deceased was a well-known bridge builder in the Border counties.

General Building News.

WESLEYAN CHURCH AND SCHOOLS, EASTBOURNE.—On the 1st inst. the foundation-stones were laid of the new Wesleyan church and schools which will occupy the corner site, which has frontages to three thoroughfares—Pevensey-road, Susans-road, and Langney-road. The builders are Messrs. Miller & Selmes, and the architect is Mr. Carlos Crisford, of Eastbourne. The total cost of the scheme (including the purchase of land) is to be 13,500*l*. The schools will cost 4,000*l*. In the basement there will be a kitchen, heating chamber, and stores; on the ground floor a hall (seating about 330), a ministers' vestry, and five classrooms; and on the first floor three classrooms and a choir vestry. The church, which will represent an outlay of about 9,500*l*., will be of Gothic design, and will have a spire 100 ft. in height. In addition to the seats on the ground floor there will be four galleries. There will be accommodation for between 800 and 900 worshippers. Messrs. Francis & Sons, stonemasons, are supplying the stonework in the building.

EPISCOPAL CHURCH, ABERFELDY, N.B.—St. Margaret's Episcopal Church at Aberfeldy is now nearing completion. The church consists of a chancel, choir, and nave, and is seated for about 100 people. The walls are of stone and brick, plastered inside and cement rough-cast outside. The roof is open to the apex, and the laminated circle principals and hammer beams are brought down to freestone corbels, each of which is met by a simple buttress or prop outside the main walls. The chancel arch is semi-circular, and the chancel proper is vaulted over in plain plaster. All the woodwork, including the main roof, is for the present oakstained. The windows are glazed with cathedral glass. There is also a small vestry. The building is a neat little structure designed and carried out under the superintendence of Mr. W. Bell, C.E., and Mr. Rhoderic Cameron, architect.

MISSION CHURCH AND INSTITUTE, EAST FERRY.—The Bishop of Lincoln opened on the 3rd inst. the new Mission Church and Institute which has been erected in the parish of East Ferry, Lincolnshire. The premises were designed by Messrs. Connon & Chorley, of Leeds, and the work has been carried out by Mr. Roberts, of Blyton. The church and institute are both built of red pressed bricks.

METHODIST CHURCH, BOOTH TOWN.—New United Free Methodist church buildings have been erected and opened in Booth Town. The premises comprise a church, which hold 450 on the floor and seventy in the gallery, and a school with eleven classrooms, accommodating 450 scholars. The total cost has amounted to 4,500*l*., and the architect of the work was Mr. C. F. L. Horsfall.

COUNCIL SCHOOLS, GLOUCESTER.—The block of Council schools recently erected in Derby-road, Gloucester, were opened on the 8th inst. The buildings include a two-storied block to accommodate 350 boys and 350 girls, and a separate one-storied block to accommodate 400 infants, with floor space for fifty additional infants should future requirements demand extension. A sheltered quadrangle is provided between the two blocks, available for outdoor drilling and exercise. The buildings are erected with Severn-side bricks with T.L.B. gauged arches, Bath stone dressings being used for entrance doorways and window dressings. The roofs are covered with green slates. Internally the walls are finished with glazed brick dados for entrance corridors, staircases, and cloakrooms, and those for central halls and classrooms are finished with adamant dados coloured in red duresco, and the walls above dados are plastered and coloured in pale green, whilst the woodwork is in dark brown stain and varnished, the whole of the floors, ceilings, flats, and staircases being in Hennebique's Ferro-Concrete construction, whilst the floors of the

central halls and classrooms are laid with Challenge flooring finished red. The contract for the heating and ventilating has been carried out by Messrs. Beaven & Sons, Ltd., of Gloucester, under the direction of Mr. E. J. Cullis, the contract price being 1,265*l*. The electric lighting and bells have been installed by Messrs. Mitchell & Co., of Gloucester; and the decorating work, finished in duresco, has been carried out by Messrs. E. Pickford & Son, Gloucester. The school desks for the girls' and infants' departments have been made by Messrs. Ashbee & Sons, Gloucester, and those for the boys' department by the Gloucester Joinery Company, Ltd. The general furniture has been supplied by the Bennett Furnishing Company and Messrs. Allan Jones & Co., and the blinds have been fitted by Mr. Price, Gloucester. The general contract has been carried out by Mr. J. G. Norman, of Swindon, whose contract amounted to 11,908*l*. Mr. John Lake was the general foreman, and Mr. W. H. Bush has filled the post of clerk of the works. The whole of the buildings have been designed and carried out under the supervision of Mr. J. Fletcher Trew, architect, of Gloucester.

COUNCIL SCHOOL, WHEATLEY.—On the 4th inst. a new County Council senior mixed school, erected at a cost of 3,700*l*., was opened at Wheatley, a suburb of Doncaster. The premises have been erected from plans prepared by Mr. J. Vickers Edwards, the West Riding County Architect, the contractor being Mr. Greenwood, of Gainsborough. The main feature of the structure is the central hall, with five classrooms opening from it, together with three teachers' rooms. The building is of brick with stone facings, and has been fitted throughout with new dual desks of pitch-pine, and is heated with hot-water apparatus by Messrs. Farr & Son, and lighted with incandescent gas.

NEW SCHOOL, TINSLEY.—On the 6th inst. the new Council school at Tinsley was opened. The school has cost about 5,200*l*., and will accommodate about 540 children. The total area covered by the buildings and playground is about 1½ acres. The central hall, around which the classrooms are arranged, is 73 ft. by 36 ft. in extent. The nine classrooms arranged around are 25 ft. by 24 ft., and are to accommodate sixty scholars, but in addition to these classrooms there are the headmaster's room, two teachers' rooms, and two cloakrooms. The buildings are of red brick, with stone dressings. Mr. J. Vickers Edwards prepared the plans, and Messrs. W. Barton, of Thorne, Doncaster, assisted by J. Snowdon & Sons, Barnsley, have erected and decorated the building.

NEW SCHOOL, LANCASTER.—A new mixed school has been erected at the Sneanes, Lancaster. The building gives classroom accommodation for 680 children, the junior mixed on the ground floor, and the senior mixed on the first floor. On each floor there is a central hall, six classrooms with teacher's room, stockroom, and cloakroom. In the basement provision has been made for the teaching of cookery and manual training. There are separate playgrounds and entrances for boys and girls, but the classes are mixed. The playgrounds are covered with asphalt. Inclusive of the site the total cost has been 13,167*l*. The contractors were:—Masonry, Messrs. J. Hatch & Sons; joinery, Mr. E. Thompson; slating, Messrs. T. & J. Till; plumbing, Mr. Abbott; painting, Messrs. Crook & Linthwaite; drainage and asphalting, Mr. Joe Johnson. The school has been designed and erected under the supervision of the Borough Surveyor, Mr. J. C. Mount.

WESLEYAN SUNDAY SCHOOL, BAGSHOT.—The foundation-stones of the new school which is being erected at the rear of the Wesleyan Church, at Bagshot, were laid on the 1st inst. The present scheme includes a schoolroom for 200 scholars, with five good classrooms, a minister's vestry, kitchen, etc. The builder is Mr. Knight, of Camberley, and the architect Mr. W. J. Hodgson.

WESLEYAN SCHOOL ENLARGEMENT, BARBROOK MILLS, DEVON.—A new wing, containing a classroom, cloak-rooms, and offices, is being added to the Barbrook Mills Wesleyan School. The builder is Mr. Bob Jones, of Lynton, and the work is being carried out from the designs of Mr. A. Lauder, architect.

WESLEYAN SUNDAY-SCHOOL, BURNHAM.—The foundation-stones of the new Sunday-school and extension of the Wesleyan chapel were laid a short time ago. The works comprise the addition of transepts to the existing chapel and the erection of new school premises in the rear. The western transept will provide forty-eight additional sittings. The eastern transept will add twenty sittings to the choir seats, making a total for the choir of forty-eight. The schoolroom measures 48 ft. by 29 ft. It will accommodate 280 adults, or about 350 children. In addition there are on the ground floor an infant school and a vestry; also lavatory accommodation and arrangements for tea meetings. On the upper floor there are to be a church parlour and seven classrooms. The architects are Messrs. La Trobe & Weston, F.R.I.B.A., of Bristol, and the contractor is Mr. H. W. Pollard, of Bridgwater. It is estimated that the total cost will be over 1,400*l*.

PROPOSED NEW HYDRAULIC STATION, MANCHESTER.—On the 4th inst., at the Manchester Town Hall, Mr. W. O. E. Meade King, Inspector of the Local Government Board, heard evidence in support of an application by the Corporation for sanction to borrow money for the supply of water for hydraulic purposes. Mr. T. Hudson, Deputy Town Clerk, explained the proposals, which were to erect a new hydraulic station in Water-street at a cost of 50,000*l*. Mr. H. Price, the City Architect, and other officials gave details of the works to be undertaken.

TENNIS COURT, CRABBET PARK.—A tennis-court has just been built under the direction and superintendence of Mr. Joseph Bickley, for the Hon. Neville S. Lytton, at his seat near Three Bridges, Sussex. Whilst somewhat limited in his designs by the requirements of the game, Mr. Bickley has succeeded in erecting a court which possesses many pleasing and uncommon features. It is constructed of red brick, after a simple and effective Georgian design, with side windows copied from some of the best specimens of French tennis courts. An elegantly-designed dedans contributes to the attractiveness of the interior, of which the floor, the net-post and columns, and the bandeau are coloured in two tints of red, the walls and chases being painted black, and the top of the pent-house dark green. A red floor is a recent and successful experiment in racquet and tennis courts.

NEW WING, CLIFF COLLEGE, DERBYSHIRE.—A new wing has been added to this college. It provides additional lecture-rooms, classrooms, bedrooms, etc., and has been built by Messrs. Boot & Son, contractors, Sheffield, to plans drawn by Messrs. Hemsoll & Chapman, architects, Sheffield.

PROPOSED MEMORIAL HALL, NOTTINGHAM.—Plans have been prepared by the architects, Messrs. A. R. Calvert and William R. Gleave, for a hall which it is proposed to build in St. Ann's parish as a memorial to the late Canon Lewis. The complete scheme provides on the ground-floor a hall 50 ft. by 30 ft., with a cloakroom and a classroom on either side of the entrance lobby. At each corner of the front are two committee-rooms, having separate entrances from Coppice-road. They also communicate with the large hall. There are retiring rooms on either side of the platform, which can also be used for class-rooms. At the back of the building there will be a kitchen. Over the main entrance lobby and cloakrooms a classroom about 20 ft. by 16 ft. will be provided. The basement will comprise a hall 32 ft. by 26 ft., with a room suitable for a men's institute, with reading and games rooms.

POST OFFICE, BRENTFORD.—The Treasury has sanctioned the expenditure of an approximate sum of 3,000*l*. for the erection of a new post-office at Brentford. The plans, which have been prepared by Mr. Nowell Parr, Surveyor to the District Council, together with Mr. J. Kates, have been approved by the Postmaster-General. The building is to be erected at the junction of the Half Acre and St. Paul's-road, and will have a frontage of 100 ft., whilst a space of 37 ft. will be available for future extensions. Messrs. J. Dorey & Co are the builders.

NEW RAILWAY-STATION, MORECAMBE.—The Midland Railway Company have rebuilt their station at Morecambe. The new station buildings occupy a site between the company's laundry and the goods shed, and have a frontage of about 250 ft. The general plan of the buildings is an enclosed parallelogram, with the various offices, waiting-rooms, etc., ranged around it. Along the front are the main entrance-hall, with three wide doorways in the centre, with the booking hall, booking offices, and parcel office and cloak-room on the right, and the general waiting-room, ladies' first-class and ladies' third-class waiting-rooms on the left. These all open on the inner side upon a glass-roofed circulating area, 174 ft. long by 50 ft. wide. From this area there are at either end exits for passengers who do not require carriages. The exit passages are 16 ft. wide, and are covered. Across the circulating area from the booking hall are three 20 ft. approaches to the platforms proper, divided by two blocks of lavatories—one for ladies, the other for gentlemen. In the angles of the main buildings at one end of the area are the station-master's office and rooms for guards and porters, and at the other a refreshment-room and popular *café*. Two island platforms, each 30 ft. wide, are completed, giving room for four full-length trains at once, and a third double platform can be constructed when required. Each platform is 900 ft. in length, and they are all practically straight. The platform on the north side is covered with a glass awning for two-thirds of its length. The platforms have stone and concrete copings, and will ultimately be asphalted. Mr. W. B. Worthington, the Midland Company's Engineer, has designed and carried out the works, Mr. Wheatley being responsible for the architectural part. With the exception of the buildings, which were let by contract to Messrs. C. Murgatroyd & Son, of Idle, the whole of the work has been done by the company's staff. Mr. F. J. Greasley has been the Resident Engineer and Mr. C. Dunnicliffe Clerk of the Works.

NEW WORKHOUSE, FYLDE.—On the 27th ult. the new workhouse for the Fylde Union was opened. The workhouse has been designed by and carried out under the superintendence of Messrs. Haywood & Harrison, architects, of Accrington and Lytham. It is built on the pavilion system. The accommodation is for 300 persons, exclusive of staff. In the centre is placed the administrative building, which consists of a central dining hall, with glazed brick walls, and open timbered pitch-pine roof, with kitchens, sculleries, store-rooms, etc., and a house for the master. To the right and left are the different pavilions, all communicating with the administrative block by a wide, covered corridor, the females being placed on the east side and the males on the west side. The able-bodied and aged inmates of both sexes will have for their accommodation two three-storied pavilions, with day-rooms and dormitories. A separate pavilion is provided for mothers and infants, and infirm females, and also a two-roomed cottage for married couples. To the rear of these are placed the laundry, bakery and boiler and engine and pumphouse. The infirmary buildings, consisting of a nurses' home, and two-story pavilions for males and females, occupy the most elevated position to the north of the site, and accommodation is provided for fifty patients of each sex. The vagrants' block, for twenty-five tramps, is placed at the entrance to the site, with porter's office and living rooms to the right and left, and commanding a view of the entrance-gates. In this block are placed the receiving-rooms—male and female—with day-rooms, bathrooms, and clothes stores, while a steam disinfector is also provided. The offices and board-room are contained in a block of buildings, comprising four large committee-rooms and an entrance-hall. The outdoor relief office with its attendant waiting-rooms and conveniences is set back from the main block at the westerly end of the building, and at the opposite end is the registration office, with a strong-room. A feature is the water-tower, built for the purpose of utilising the supply of water obtained by the sinking of a well in the grounds. The heating throughout and the hot-water supply for all purposes are worked from a central station, under the control of the resident engineer, and rotary pumps assist the circulation. All the different pavilions are in telephonic communication. The buildings are faced with Accrington red-pressed bricks, and stone dressings, and the work has been carried out by Mr. Sam Wilson, of St. Annes.

NEW POST-OFFICE, ABERDEEN.—The new Aberdeen Post-office was opened for public use on the 8th inst. The building, which is of granite, rises three stories high above the street level, covers an area of 2,582 superficial yds., and has a frontage to both Crown and Dee streets. The public entrance porch is placed in the centre of the Crown-street front and gives access to the public office, which has a floor area of 2,000 superficial ft., and a ceiling 20 ft. high. The walls of this apartment are lined with marble to a height of 9 ft., the floor is of mosaic, the woodwork of wainscot, and the ceiling panelled. The public counter forms three sides of a square and has a total length of 84 ft. Two other entrances in Crown-street conduct respectively to the public inquiry office on the street floor, and the surveyor's and postmaster's room on the first floor. The top floor of the Crown-street block contains a telegraph school, telephone-room, mechanics'-room, etc. The whole area of the Dee-street floor between the Crown-street and Dee-street blocks is taken up by the letter and parcel sorting office with a floor area of over 11,400 superficial ft. The mail loading platforms are on its south side with gateway to both streets, while on the north side additional loading accommodation for exceptional traffic is provided under a covered annexe. The Sunday letter callers will enter this annexe through a door in Crown-street, receive their letters, and pass out on to Dee-street. Upon the first floor of the centre connecting block the medical officer, pay officers, telegraph engineers, etc., are accommodated, whilst the top floor is occupied by the telegraph instrument-room, which has a floor area of 4,520 superficial ft. and an open ceiling, average 20 ft. high. The ground floor of the Dee-street block contains the telegraph delivery room and bicycle room, also a retiring-room for postmen. The two staircases with entry from Dee-street give access to the first and second floors, on the former of which are placed the staff dining and serving rooms and large sorters' retiring-room, whilst the latter is almost exclusively given over to the Great Northern Telegraph Company. A basement extends under the whole area of buildings, providing accommodation for basket storage, heating chamber, battery-room, etc. Both street fronts of the structure are faced with Kemnay granite. The buildings, though only three stories high, attain a general height to the top of the parapet of 58 ft. above the street level, while

gables and turrets rise still higher. The designs were prepared in His Majesty's Office of Works, Edinburgh, under the direction of Mr. W. W. Robertson, late H.M. Principal Architect for Scotland, but were carried out by Mr. W. T. Oldrieve, F.R.I.B.A., H.M. Principal Architect for Scotland, the cost being over 50,000*l.* The clerk of works is Mr. J. Reid, and the general contractors Messrs. Peter Bisset & Sons, of Aberdeen.

BUSINESS PREMISES, CARDIFF.—New premises have been erected for Messrs. John Williams & Sons in Queen-street, Cardiff. The material used in the front of the new premises is Forest red stone, and the floors and roof have been constructed throughout on the Hennebique patent fireproof system. The buildings were designed by Mr. Edwin Seward, and the contractors were Messrs. W. Thomas & Co.

Sanitary and Engineering News.

SEWAGE WORKS, CEFN.—The sewerage works which have been constructed by the Wrexham Rural District Council were opened at the Dolydd Farm, Cefn Mawr, a short time ago. The system adopted for dealing with the sewage is bacterial, the works comprising screening chambers, rectangular and circular sedimentation tanks, a percolating filter and land treatment. Mr. J. Price Evans was the engineer of the scheme.

HOUSE DRAINAGE IN MARYLEBONE.—The Medical Officer of Health of Marylebone, in his annual Report issued this week, says that a considerable number of new premises, many of an important character, had been constructed during the past year in the borough. Plans with regard to the drainage of these buildings had been considered and approved by the Public Health Committee, and the laying of the drains had been supervised by Mr. Gorniot in the district south of the Marylebone-road, and Mr. Perry in the district north of the Marylebone-road. In all 371 plans of new drainage, representing 46,000 ft. of pipes had been dealt with. In four cases proceedings had been taken against builders for contravention of the law which compelled them to give notice of proposed new drainage, and to deposit plans and specifications, and fines (inclusive of costs) of from 22s. to 5*l.* 3s. imposed. A good many instances of combined drainage came during the twelve months before the Public Health Committee. It was the general opinion of those conversant with the subject that some alteration of the law is necessary so as more clearly and more sensibly to define the terms "sewer" and "drain." In his opinion the best alteration would be to throw upon the local authority the burden of construction and maintaining all connexions to sewers underneath the public roads, while all pipes or drains within the curtilage should be considered private drains. At present the owner of a private drain has to maintain and construct such drain from its higher end to the sewer. The portion under the road he cannot meddle with without the sanction of the authority. In Marylebone he cannot even construct that portion himself, but it was done at his expense by the local authority. Should, from causes over which he has no control, such portion get into a bad state he has to pay for its reconstruction and repair. The principle seems to be sound that pipes under roads and streets should be owned by the local authority and not by private individuals; under such a system the maintenance of the sewers would in the long run be less, and problems of so-called "combined drainage" would be easy of solution.

HOUSING AND HEALTH.—The Medical Officer of Health of Tottenham, in his annual Report just circulated, says that the large majority of the population of the district live in tenements containing less than five rooms, and the tendency is towards a steady annual augmentation in the percentage of persons so residing. While there were few houses in such a condition as to warrant an endeavour to secure their closure, yet there is a considerable amount of old and jerry-built property which gives the Public Health Department unending trouble with a minimum of satisfactory results. It is noticeable that this borderline class of property is chiefly tenanted by people of careless, not to say uncleanly habits. The wise, thrifty, cleanly heads of families, knowing the importance to themselves and their children of living in healthy homes, exercise greater caution and incur more trouble in choosing their dwelling-places, and are willing, too, to pay a higher price for suitable ones when found, than are the happy-go-lucky characters who are generally found occupying old or jerry-built property.

ARTESIAN SPRINGS UNDER QUEEN VICTORIA-STREET.—It has been proved conclusively, by the number of artesian wells that have been bored in different parts of London, that there is an inexhaustible supply of water in the natural lake which underlies London. One of the latest buildings to adopt these means to be independent of the supply from the Metropolitan Water Board is Mansion House-chambers, Queen Victoria-street, where the whole of the water is obtained from an artesian well, which has been carried down through the Woolwich and Reading beds, into the chalk formation, and yields a splendid supply, which has proved on analysis to be of excellent quality. A specially-designed, electrically-driven artesian well pump has been lowered down the bore hole to a depth of 230 ft., and delivers 1,000 gallons per hour into a large masonry reservoir situated in the basement. The water is then forced up with a second set of electrically-driven pumps, into the tanks on the roof of building, from whence it gravitates to the different floors. The installation has been carried out by Messrs. Alfred Williams & Co., of Artesian Works, Bow.

NEW SEWAGE WORKS, MACCLESFIELD.—The extensions and improvements which have been made at the Macclesfield sewage-disposal works at Butley have now been opened. The sewage is now brought to the works by a 24-in. stoneware pipe sewer, laid at a gradient of 1 in 400. At the entrance to the works two storm-water overflow sills have been fixed. The surplus over six times the normal flow is arrested by the first sill, and conveyed direct to the river by means of a 12-in. stoneware pipe, while the second sill arrests all the sewage between three and six times the normal flow, this volume being conveyed direct on to the land. An electrically-driven detritus lift, capable of lifting the whole of the sludge, has been fixed in the existing Detritus tanks, the sides and bottom of which have been re-formed in concrete to the necessary shape. The total cost of the new works has been 14,000*l.* The work on the main contract, which included the whole of the constructed work and the filling of the finishing filter, amounting to about 10,000*l.*, was carried out by Mr. James Owens, of Wolverhampton. A sub-contract under the above for the provision of the distributors, and all the electrical plant, was let to Messrs. Mather & Platt, Ltd., of Manchester. The providing of materials and filling of the percolating filters was carried out by Mr. Stephen Sheldon, of Bollington. Messrs. Stott & Co., of Haslingden, provided and fixed the detritus lift. Mr. A. Brough, of Macclesfield, acted as clerk of the works, under the engineers, Messrs. Berrington, Son, & Martin, Wolverhampton.

Foreign.

FRANCE.—The Municipal Council of Paris adopted during their last session a programme for new school buildings to the extent of 80 million francs.——The Government have decided that the Saint Lazare prison and that of the Petite Roquette should be rebuilt in the district of Javel (XVth arrondissement). This double operation represents an outlay of about 5½ million francs.——The remains of a large Gallo-Roman cemetery have been discovered at Paley (Seine-et-Marne), also the remains of a thermal establishment supplied by an aqueduct of which the foundations are still visible.——The canal from the Marne to the Saône is to be opened in June, the ceremony taking place at Langres.——A Lycée for girls is to be built at Montbéliard, at a cost of 500,000 francs.——A sum of 80,000 francs has been voted towards the erection of an "Ecole Supérieure" at Marennes (Charente Inférieure). M. Bunel is the architect.——A new hospital is to be built at Bagnères-de-Bigorre, at a cost of half a million francs.——The Town Council of Besançon have voted a sum of 600,000 francs for the prolongation of the Rue de la Préfecture.——The railway company of "Chemins-de-fer de l'Etat" are about to build a new terminus on the site of the fortifications of La Rochelle, at an estimated cost of 3,400,000 francs.——The "Congrès des Sociétés Savantes" has been held, the last few days, at Montpellier. It included a section dealing with archæology.——The "Société pour la Protection des Paysages" has passed a resolution to the effect that the height of new houses to be built at Carcassonne should be restricted to limits that will not allow them to overpower the effect of the ancient city.——The jury in the competition for the rebuilding of the theatre at Nancy have awarded the first premium to M. Hornecker, architect, of Nancy.——The Town Council of Pau have voted 340,000 francs for the building of schools and a market at St. Esprit.——The death is announced of the landscape-painter, Léon Richet, a pupil of Diaz, of Jules Lefebvre, and of Boulanger. His best works were inspired by the country of Fontainebleau, of Compiègne, and of parts of Normandy. He had received medals in the Salons of 1885, 1888, and 1901.——The jury in a competition for a new hospital at Nantua have awarded the first premium to M. Rochet, of Bourg.

EGYPT AND THE SOUDAN.—Lord Cromer, in his report for 1906, just issued from the Foreign Office, states that since 1886 extraordinary expenditure to the extent of 2,447,000E*l.* has been incurred on public buildings. In spite of this Egyptian progress is in every direction being retarded by want of public buildings. From all quarters demands are received for hospitals, schools, post-offices, police barracks, etc. It is quite impossible to meet all these demands simultaneously. Besides the money spent by the Prisons, Sanitary, and Customs Departments, who supervise their own expenditure under this head, no less than 378,000E*l.* was spent in 1906 by the Public Works Department; forty-three public buildings were completed, and forty-eight others were under construction. Of the total expenditure about 96,000E*l.* was spent on schools and modern workshops. Good progress has been made in the matter of Nile bridges. It is probable that the Rodah-bridge will be completed within the contract time. Sir William Garstin writes that the steel work has come together very well, and that the quality is excellent. Sir Benjamin Baker reported on this bridge on February 1 as follows:—

"I have to-day inspected it, and am able to certify that, as regards material and workmanship, it is entirely satisfactory, and that in all respects the structure is a fine example of the high-class work which can now be turned out by bridge-builders of great experience, whose manufacturers are supplied with all the most modern appliances. The work done in this country by local labour was also of a satisfactory quality, but, as in the case of other countries where machine riveting is a novelty, some of the work had to be done twice over, and, in the present case, owing to the demand for riveters on other works in Egypt, the contractors had not only to train their own men, but also practically to train men for other works, where contractors did not hesitate to pay whatever sum might be necessary to secure trained riveters from the Rodah Bridge. This double training was, no doubt, somewhat of a hardship to Messrs. Sir William Arrol & Co., but it was an advantage to the country, having regard to the demand for riveters."

The designs for the construction of the new bridge at Boulac are still under consideration, but it is hoped the work will be put up to public tender in the course of the current year. The repairs to the temples in Egypt have progressed satisfactorily. At Karnak the columns which fell in 1899 have all been re-erected by Mr. Legrain. The next operation which Mr. Maspero proposes to take in hand is the restoration of the fallen Pylon at the west end of the great hall of columns. The repairs to the Temple of Edfou have been completed by Mr. Barsanti. Mr. Quibell has commenced excavations at Sakkara. He has discovered certain interesting monuments of the IXth and Xth Dynasties. Some interesting finds have been made by Messrs. Lefebvre and Edgar, the Inspectors of the Antiquities Service. The former discovered the fragments of a manuscript play of Menander, and the latter found at Zagazig a collection of exquisite silver work of the time of Rameses II. The painting of the interior of the Cairo Museum has been completed, and the rearrangement of the collection can now be pushed forward. Seven volumes have been added to the Museum catalogue. Twenty small statues were stolen from the Museum last year, of which only six have been recovered. On the subject of the preservation of Arab monuments Lord Cromer states that a sum of 13,200E*l.* was spent last year on the preservation of ancient Moslem and Coptic buildings. Of the various works undertaken by far the most important was the restoration of the Sultan Hassan Mosque. The total expenditure on this up to the end of last year amounted to 11,000E*l.* Much still remains to be done before this grand example of Arab architecture can be considered as effectually protected against decay. He adds:—

"I mentioned in my last report that, on the initiative of Mr. Somers Clarke, it had been decided to take in hand the repair of the celebrated coptic monasteries at Sohag, known as Deir-el-Abyad and Deir-el-Ahmar. An examination of the buildings has been made, and an estimate framed of the cost of the repairs. Only about 600E*l.* was spent last year on the White Monastery (Deir-el-Abyad). The building is in such a bad state that it was found impossible to push the repairs any faster."

In the Soudan various public buildings, such as barracks, post and telegraph offices, quarters for Government officials, schools, etc., are well on their way to completion. Considerable progress has been made with the dockyard at Port Soudan, the machinery of which is now being installed. An open-span bridge across the harbour is in process of erection. The question of the future water supply of Port Soudan has not yet been settled. An artesian boring was made and carried down to a depth of 800 ft. An ample supply of fresh water was found, but it proved to be impossible to protect it from the influx of sea water. A second boring is now being made. If the results are not satisfactory it will be necessary to incur the heavy expenditure of bringing water from the hills, a distance of about thirty miles. Lord Cromer quotes at some length a report by Captain Kennedy on the subject of the treatment of British manufacturers and the question of British

trade abroad. The following is one of the passages :—

"Generally speaking, the machinery and plant we have received from England have been excellent; the machine work especially being of a first-rate description. Large quantities of Portland cement have been imported for building works during the year, and the quality throughout has been of the highest standard, so much so that no further supplies of either natural or artificial cement are now being obtained from Belgium. The prices of the Belgian cement are considerably lower, but the quality is distinctly inferior to British brands. On the other hand, I regret to say, as regards building stores generally, that many British manufacturers with whom we have been dealing appear to have what may be termed an export quality of material, *i.e.*, material which has not been passed as being up to the home standard, but which is sent out to this and other countries as being quite good enough for export. The result is that many 'repeat orders,' which would otherwise have been placed at home, are not repeated on account of bad materials having been received in the first instance. I can point to a great many instances of this. As regards structural steelwork, a considerable quantity of this has been received from Belgium, and has throughout been entirely satisfactory, both in quality and workmanship. Curiously enough, I happen to know that some orders placed by me in England were sub-contracted for in Belgium, and shipped direct from Belgium to the Soudan. As regards American machinery, a certain amount of special plant has been received from America, and this, though excellent in design, has been in every single instance of an inferior quality structurally. For example, some well-boring plant—of the American oil-well type—though admirably designed, was of the very worst description, with faulty castings and bearings, and unfinished machine work. Some steam road-rollers also, designed for special work, were found to be manufactured and finished in a manner that certainly fell far short of the ordinary British standard. In consequence of this it has, in some cases, been found advisable in the case of special plant of American types, to obtain the detailed designs from America and have the manufacture of the same carried out in England."

In regard to archæology in the Soudan, want of funds prevents the Soudan Government from doing all that can be wished in the direction of preserving the antiquities of the country. At the same time, considering the very slender resources at its disposal, Lord Cromer considers that Mr. Crowfoot, the Conservator of Antqiuities, has done a great deal. In the Halfa Province Mr. Scott-Moncrieff's work of inclosing and roofing the temple near Wady Halfa has stood well. Steps have been taken for the removal of some villagers who recently occupied the old temple at Kumma. In the Dongola Province Colonel Jackson has saved, by timely repairs, the few remaining columns in the temples near Gebel Barkel (ancient Napata). Arrangements have also been made for the temporary protection of the church at Old Dongola, which plays a large part in mediæval Nubian history. In the Berber Province one of the columns in the temple of Massurat, which was in a dangerous condition, has been strengthened. The rest-house at Nagaa has been completed, a Ghafir appointed, and a rest-house built near Massurat. As to the results of researches so far made by the Archæological Department, the past year was fruitful in the discovery of Christian antiquities. A series of old Nubian papyri, written partly in Meroitic and partly in other known characters, is now in the hands of the Berlin savants. When the results of their studies are published it may be expected that a good deal of light will be thrown upon the hitherto undecipherable inscriptions of the Soudan.

NEW CHURCH, KHARTOUM.—A church is being erected at Khartoum from the designs of Mr. R. Weir Schultz, of London. The plan includes nave, with narrow passage aisles, chancel, and transepts; the latter can be used separately as chapels, and it has been suggested that the north one should be called the Gordon Memorial Chapel. The church will stand on a terrace raised about 2 ft. above the surrounding garden, the floor of the nave being 4 ft. above this; the choir to be raised three steps above the nave, and divided from it by an open screen of woodwork, to be constructed of timber from the Bahr-el-Ghazal. The stalls will also be made out of this or some other native wood. A crypt will be formed underneath the east end, access to this being obtained by two small circular staircases from the ambulatory; this crypt to be divided into two parts as vestries for choir and clergy. On occasions, however, the screens can be removed, and the whole crypt thrown into one, and used for parish meetings and other kindred purposes. At the west end of the nave there will be an inner porch extending the full width of the church, and over this a small western gallery. The main entrance door will be in the centre of the west front, at the level of the outside terrace. Broad steps will ascend from this to the porch level inside. It is proposed that this door be used on occasions of state or special ceremonial, and that access be obtained ordinarily through covered outside porches on either side of the main doorway, one entering from the north and the other from the south. This allows of the entrances being regulated to suit the prevailing winds. Internally the church will be divided into bays by a series of cross arches with brick vaulting between. The lighting will be by means of windows placed on each side of the church above the arches into the passage aisles, which arrangement allows of the windows being set well back from the external face, and of the formation of an outside ambulatory over the aisles and which will go all round the church at this level. By this means no direct sunlight should strike on the windows. In hot weather, by means of screens hung on the outside walls of the ambulatory and kept damp by running a trickle of water over them, the air can be moistened and cooled before entering the church. The design for the church includes a detached tower of considerable size which will be placed to the south of the western porch, and be arranged to group with the rest of the church. It is hoped that this tower will contain a peal of bells and a clock. In the lower part the baptistery will be placed, access to it being obtained direct from the porch by a covered passage. It is intended to build the church with stone from the quarries of Gebel Auli on the White Nile, twenty-eight miles south of Khartoum, and to cover the vaults with local red bricks. The floor will probably be of marble, and it is hoped to use some Sudanese marble for part of this. The seating will be by chairs, which can always be moved to suit the varying size of the congregation. Space is to be provided for about 600.

Miscellaneous.

SOCIETY OF 25 PAINTERS.—At a general meeting of the "Society of 25 English Painters" it was decided to alter the title of the society to "The Society of 25 Painters," so rendering all artists who are born British subjects eligible for election as members. The committee have made arrangements with Messrs. Marchant & Co. with reference to their exhibitions, which will henceforth be held at the Goupil Gallery, 5, Regent-street. Several new features will be introduced, such as a summer exhibition of sketches, etc., full details of which will be announced in due course. The society's exhibition at Berlin, which has just closed, is being followed by exhibitions at Dusseldorf, Munich, Hamburg, and other German cities.

NATURE STUDY POSTCARDS.—The *Country Press* have just issued two more of their sixpenny packets of instructive nature study postcards; one packet including fac-similes of six British trees in winter; the other, fac-similes of the boles of the same trees, each tree form being accompanied by letterpress description. The current issues make the seventh and eighth, the previous ones comprising all the British ferns on seven cards; the leaves of the principal British trees and shrubs on twelve cards; trees in winter and tree boles on twelve cards; and a selection of British grasses, popularly and botanically named on twelve cards. For four shillings and sixpence, therefore, the lovers of trees and ferns can obtain a substantial instalment of nature study reproductions.

AN IMMENSE CHIMNEY.—A chimney, which is claimed to be the highest in the world, is about to be constructed upon a lofty and exposed site at Great Falls, Montana, for the Boston and Montana Consolidated Copper and Silver Mining Company by the Alphons Custodis Company at a contract price of some 200,000 dollars for the shaft. The *Engineer*, of Chicago, says it will be carried up to a height of 506 ft. from the foundations, with an internal diameter of 50 ft. at the flue outlet, the dimensions being calculated for the discharge of 4,000,000 cubic ft. of gases per minute at a maximum temperature of 600 deg. Fahr., and to resist a gale at the rate of 125 miles per hour. The men and material will be lifted by means of electrical elevators serving the scaffolding inside, and the total weight to be borne by the foundations is calculated at about 17,000 tons. The gases will be drawn from the smelter furnaces through flues having an aggregate length of 2,000 ft., and the designs provide for raising the chimney to a further extent of 60 ft. in the event of an increased draught being required.

GARDEN VILLAGE, HULL.—The Holderness House estate, about 1,760 yds. by 440 yds. in area, at East Hull, has been bought by Sir James Reckitt, who intends to lay out the land for a "garden village," to accommodate an estimated number of 10,000 residents.

CHURCH TOWER, PEEL, ISLE OF MAN.—By reason of the dangerous condition of the tower, the parish church of St. German has been closed since December. A fund is opened for the re-instatement of the tower at an outlay of about 2,500*l.* Four years ago a sum of 3,000*l.* was raised for a reparation of the fabric which had been partly unroofed by a gale. The old parish church was built in or about 1245 as the cathedral within the precincts of Peel, formerly Holme Town, Castle; a groined vault beneath the east end served as the ecclesiastical prison.

TOWER, HILGAY, NORFOLK.—A fund is open for the reparation of the tower of the parish church of All Saints, Hilgay, near Downham Market, and to complete it with a spire. The tower, constructed of brick, was rebuilt by Captain Manby when churchwarden. The inventor of an apparatus which has been the means of rescuing so many persons from shipwreck lies in the churchyard, and it is suggested also that a stone suitably inscribed should be erected to mark the position of his grave.

CHRIST CHURCH, CREWE.—A faculty has been granted by the Diocesan Consistory Court for extensive alterations and improvements (with a new side chapel) of Christ Church, Crewe, of which the cost will be defrayed by a legacy of 2,000*l.* bequeathed by the late Mr. F. W. Webb, chief engineer of the London and North Western Railway Company.

OPEN SPACES.—Mainly through the efforts made by Mr. Cowan, M.P. for the division, and Mr. Davies, secretary of the local committee of the Commons and Footpaths Preservation Society, a threatened spoliation is averted from the heath which lies in Witley Manor, and extends from the slopes of Hindhead to near Milford on the outskirts of Godalming. The Witley Parish Council have relinquished an application which they made in December last to the Board of Agriculture for leave to purchase and enclose three acres of the common land for conversion into a burial ground for the ecclesiastical district of Milford. Since the passing of the Law of Commons Amendment Act, 1893, enclosure cannot be made at the will of a lord of the manor solely upon the pretext that a sufficiency of pasturage will be left to the commoners. The Board of Agriculture are required, before consenting to enclosure, to consider the public benefit in disregard of private profit. In this instance the Board have pointed out to the Parish Council that serious technical difficulties might stand in the way of a valid appropriation of the common land for the object in view. The wild, open, and beautiful tract in question abuts on the main road to Midhurst and Chichester in its course through the midst of Witley Common.——An appeal is made for contributions to an amount of 1,300*l.* in order to acquire 600 acres of sandhills and pasture land near the seashore at Rhosneigr, and thereby to preserve permanently the largest common in Anglesey.——Proposals are made to raise 9,000*l.* wherewith to purchase as a people's park and recreation ground 3½ acres of the Grove Hall estate, consisting of nearly 12 acres, between Old Ford and Fairfield roads, Bow, E., which were recently sold for 22,300*l.*, and of which the London County Council bought two acres at a price of 6,000*l.* for electricity works.——Schemes are in progress for securing recreation grounds at Purley Beeches, 13½ acres of woodland near Croydon; Gipsy-road, Norwood; and Barking-road, East Ham, where 9 acres are offered by Colonel Burges for much less than their market value.——Mr. James Elliman has given to Slough the playing fields at Salt-hill, together with an endowment fund of 10,000*l.*

LAVENHAM CHURCH.—At a meeting of the vestry of the parish of Lavenham, the rector, the Rev. A. G. Tweedie, drew attention to the serious danger of fire that existed owing to the present defective system of heating the church. At his request a committee of practical men was appointed to obtain information as to the various systems of heating churches with a view to adopting one that would do away with the present danger. Lavenham Church, as is well known, is one of the finest parish churches in the eastern counties, and the loss that would be occasioned by a fire would be irreparable.

OFFICE OF WORKS AND PUBLIC BUILDINGS.—An official return gives the following particulars as to the staff employed and salaries paid in the Architects' and Surveyors' Division of the Office of the Commissioners of His Majesty's Works and Public Buildings:—Principal architect and surveyor, England, 1,200*l.*; ditto, Scotland, 900*l.*, rising to 1,000*l.*; six architects and surveyors—four at 550*l.*, rising to 750*l.*, and two at 800*l.*, rising to 900*l*; fourteen first-class assistant architects and surveyors at 350*l.*, rising to 450*l.*; and twenty second-class ditto at 200*l.*, rising to 300*l*; one sanitary assistant, first class, 350*l.*, rising to 450*l.*; two sanitary assistants, second class, at 200*l.*, rising to 300*l.*; one draughtsman, first class, 210*l.*, rising to 250*l.*; draughtsmen and technical assistants for additional services that may be required, cost in 1905-6, 13,762*l.*; estimated cost for 1907-8, 17,700*l.*; six clerks of works, first class, at 250*l.*, rising to 300*l*; one ditto, temporary, 300*l*; fourteen clerks of works, second class, at 150*l.*, rising to 220*l.*; one ditto, temporary (Scotland), at 4*l.* 4*s.* per week. One of the first-class assistant architects and surveyors, stationed in China and Japan to look after consular buildings, etc., has a foreign service allowance of 200*l.* per annum and an official residence; this also applies to one of the second class assistant architects and surveyors. Another of the second-class assistant architects and surveyors is in charge of the embassy buildings at Constantinople, and receives an extra acting allowance of 100*l.* per annum and a residence. No fresh appointments are made to the post of permanent draughtsmen. The question of salary of an inspector of ancient monuments is at present in abeyance.

JOHN HOWARD MEMORIAL, WARRINGTON.—A tablet to the memory of John Howard, the prison philanthropist, has been erected by the Warrington Society on Howard Buildings, Bridge-street. The memorial which is in hammered bronze, was designed by Messrs. J. E. Wright, Garnett, & Wright, architects, and executed by Messrs. George Wragge, Ltd., of Salford.

A MEDIÆVAL BRIDGE.—A discovery of great interest to antiquaries has just been made at Lincoln in connexion with the improvement of the historical High Bridge. Workmen were removing the old wall beneath the stone steps leading down from the High-street to Waterside North, when they exposed to view a buttress of stone work. This, it is believed, is a part of the chapel of Thomas à Becket, which stood on the bridge in the latter part of the XIIIth century. An oak door is to be placed in the brick wall before the buttress in order to give access to this interesting relic. A space is also to be left in the wall to permit of a view being obtained of the ground arches of what is believed to be the oldest mediæval bridge in England with houses upon it.—*Yorkshire Post*.

MEMORIAL TO THE LATE CANON T. MAJOR LESTER, LIVERPOOL.—The statue of the late Canon T. Major Lester executed by Mr. Geo. Frampton, R.A., is about to be placed in the St. John's gardens, overlooking William Brown street. The cost of the memorial, including pedestal, will be 1,500*l*.

STUDY OF ARCHITECTURE BY CLERGYMEN.—In connexion with the Architectural Department of St. David's College, Lampeter, and in the hope of encouraging the clergy who take an interest in church architecture to put on record the results of their studies, Mrs. Davies Evans, of Highmead, Llanybyther, is offering a prize of 10*l*., open to anyone in Holy Orders, for the best essay on "The Architectural and Historical Features of not more than two Churches" in the district in which he may be working. The competition shall be open to all clergy of the Church of England. The essays must reach the Principal of St. David's College not later than October 1, 1907. The judges will be the Rev. Professor Green, Superintendent of the Architectural Department of St. David's College, and Mr. W. D. Caröe, F.S.A., architect of the Ecclesiastical Commissioners, whose decision will be final.

THE LONDON GEOLOGICAL FIELD CLASS.—This class has arranged its excursions for the study of the London district, under the direction of Professor Seeley, to commence on Saturday, April 27. Mr. J. W. Jarvis, St. Mark's College, Chelsea, is the honorary secretary.

Capital and Labour.

WORKING RULES FOR MILL SAWYERS AND WOOD-CUTTING MACHINISTS IN THE LONDON DISTRICT.—The following working rules have been arranged by the London Master Builders' Association and the London Mill Sawyers and Wood-Cutting Machinists. Throughout the rules "employer" means a member of the London Master Builders' Association and "workman" means a member of the trade society or societies on whose behalf these rules have been signed. 1. That the working hours in summer shall be 50 per week for 39 weeks; that during thirteen weeks of winter, commencing on the second Monday in November, the working hours shall be 44 hours per week. Hours of labour on jobs: Summer, for thirty-nine weeks, first five days of each week, 6.30 a.m. to 8 a.m., 8.30 a.m. to 12 noon, 1 p.m. to 5 p.m.; Saturdays, 6.30 a.m. to 8 a.m., 8.30 a.m. to 12 noon—equal to 50 hours per week. Winter, for thirteen weeks, first five days of each week, 8 a.m. to 12 noon, 12.30 p.m. to 4.30 p.m.; Saturdays, 8 a.m. to 12 noon—equal to 44 hours per week. During the last three weeks of winter the leaving-off time to be 5 p.m., with one hour for dinner. In shops—the same as on jobs, with one hour for dinner in winter and leaving-off time 5 p.m. 2. That overtime, when worked at the request of the employer, shall be paid for at the following rates, namely, one hour from leaving-off time, ordinary rate; thereafter to 10 p.m., time and a quarter; after 10 p.m., double time. On Saturday the pay for overtime from noon to 4 p.m. shall be time and a half; after 4 p.m., and Sunday, double time. Christmas Day shall be paid for the same as Sunday. Workmen engaged on a night gang shall be paid one penny per hour in addition to the ordinary rate of wages. In the event of an employer exercising his option to start his mills before 8 a.m. during the thirteen winter weeks, any time thus worked in advance of ordinary hours shall be paid for at the rate of time and a quarter. 3. That one hour's notice be given or one hour's time be paid by either side on determining an engagement. All wages due shall be paid at the expiration of such notice, or walking time if sent to yard. 4. That payment of wages shall commence at noon, or as soon thereafter as practicable, on Saturday and be paid on the job, but if otherwise arranged, walking time at the rate of three miles per hour shall be allowed to get to the pay table at twelve noon. 5. That employers shall provide, where practicable and reasonable, a suitable place for the workmen to have their meals on the works with a labourer to assist in preparing them, and shall open the same one hour before starting time in winter with similar attendance. 6. That wages earned after leaving-off time on Friday and Saturday only shall be kept in hand as back time. 7. That the term "London district" shall mean a twelve mile radius from Charing Cross. 8. No reference shall be made to the Conciliation Board in consequence of any workman belonging or not belonging to any trade society.

Legal.

PLASTERER'S CLAIM AGAINST BUILDERS AND CONTRACTORS.

THE case of De Jong *v.* Johnson & Sons, Ltd., came before the Court of Appeal, consisting of Lords Justices Vaughan Williams, Moulton, and Buckley, on the 10th inst., on the appeal of the plaintiff, a plasterer, from a judgment of Mr. Justice Lawrence in the King's Bench Division in favour of the defendants.

Mr. Montague Lush, K.C., and Mr. Lever appeared for the appellant, and Mr. C. A. Russell, K.C., and Mr. Garland for the respondents on the appeal.

Mr. Lush, in opening the case, said the plaintiff was a plasterer and upholsterer, carrying on business at Bolton. His claim in the action was for 700*l*. odd for work done at the Alhambra Theatre of Varieties at Gateshead, which belonged to a limited company. The whole question in the case was whether the plaintiff who did the work must look to the theatre company for payment or was entitled to look to the defendants for payment, defendants being the contractors for the whole of the work for the building of the theatre. His (counsel's) contention was that the defendant contractors were liable to the plaintiff for his account; but the defendants' case was that the theatre company were liable only. He ought to state that at the time the plaintiff gave his estimate for doing the plastering work the defendant company did not exist, the company not being formed until June, 1905, but no question was raised at the trial that plaintiff ought to have looked to the firm instead of to the company. He ought also to state that Mr. James Johnson, sen., a director of the defendant company, was largely interested in the theatre company and was financing it. The facts were these: In June, 1904, an estimate was given by the defendant company for the work of building the theatre, and that estimate was signed by James Johnson, jun. The scheme under which the estimate was rendered was to make the contractors tender to do the whole of the work of building up the theatre for a lump sum, the estimate to include all the provisional items, which comprised the plastering work, which the plaintiff ultimately did. It was provided that the architect for the building of the theatre, Mr. T. Mould, of Newcastle, should retain the right to deal direct with all provisional amounts, and to pay direct if he so desired. The contractors whose estimate was accepted had to provide 890*l*. for the prime cost for the plastering decoration. The total amount of the provisional sums came to 6,000*l*. odd. Defendants' tender having been accepted, the contract entered into was dated August 9, 1904, and was made between the defendants and the theatre company. The defendants' estimate, which was originally for 15,000*l*., was afterwards reduced to 13,000*l*., but it was admitted that the plaintiff's estimate for the plastering work was not cut down, but was included in the 13,000*l*. estimate.

Mr. Russell said that was not admitted.

Mr. Lush said the defendants had paid the plaintiff for part of the work.

Lord Justice Vaughan Williams: Is this the ultimate refuge of estoppel?

Mr. Lush replied that it showed the defendants had ratified the authority of the architect, who had told the plaintiff that his clients were the contractors and not the theatre company, and that he was to look to the contractors for the payment of his account.

Lord Justice Vaughan Williams said that if the learned counsel could prove that the architect gave the order on behalf of the defendants he would win.

Mr. Lush said there was no doubt about the architect saying that the work was on behalf of the defendants. His case was that defendants authorised him to give that order, and ratified it by paying something on account of it.

In their result their lordships, without calling upon counsel for the respondents, held that there was no evidence of Mr. Mould's authority to contract with the plaintiff on behalf of the defendants. The appeal was accordingly dismissed with costs.

Patents of the Week.

APPLICATIONS PUBLISHED.*

6,112 of 1906.—J. G. STIDDER: *Machines for Moulding Plastic or like Substances.*

This relates to machines for moulding plastic or like substances, and consists in the combination with a pressing plunger working against a fixed floor of side walls forming a mould on said fixed floor, one of said side walls being made to slide and another side wall being removable so as to leave a gap through which the article moulded is ejected by the sliding wall or face, liners forming the inner faces of the fixed sides of said mould and adapted to be held in position by the removable side when the mould is closed and also adapted to be ejected with the moulded article when the mould is opened.

10,974 of 1906.—F. E. WALDEN: *Joiners or like Clamps.*

This relates to a clamp provided with a clamping member having a centrally apertured abutment, a screw slidable therein, and a cylindrical eccentric nut having its opening threaded to correspond with said screw, but larger in diameter, the construction comprising semi-peripheral flanges formed on said abutments and partially embracing said nut, and a locking pin inserted at the termination of one of said flanges to prevent the withdrawal of said nut.

12,565 of 1906.—J. BRIDER: *Sliding Sashes and Frames.*

This relates to a sliding sash and frame, and consists in providing the sliding pieces by which the sashes are carried with recesses designed to be engaged by thumb screws or the like screwing into the pulley stiles of the frame.

17,123 of 1906.—C. MACKEY: *Means for Securing Door and other Knobs to their Spindles.*

This relates to means for securing door and like knobs to their spindles, consisting of a bifurcated or forked keeper member or members adapted to be introduced on to the square spindle between the foot of the knob and the door or rose so as to engage and rotate with the said spindle, the said keeper being also provided with means for engaging with or being engaged by the knob.

19,680 of 1906.—W. E. SUGDEN: *Blower for Domestic Fire Grates.*

This relates to a blower for domestic fire grates and consists of an addition which when extended vertically will close the chimney space completely, and form a full-sized blower, thereby increasing the power of the blower.

21,163 of 1906.—G. F. FISHER: *Machine for Moulding Building Blocks.*

This relates to a machine for moulding building blocks, having an impression die and a wheeled mould for containing the material to be moulded, the construction comprising a vertically movable pressure platform supported beneath the die, a fixed platform or platforms secured on a level with said movable platform when in its normal position and parallel and alligned rails secured to said platforms.

24,954 of 1906.—D. MCARTHUR: *Door and Window Wedges.*

This relates to door and window wedges formed of an outer shoe or shell of pressed or other suitable metal or material filled with a padding or packing of rubber, cork, wood, or other suitable substance.

25,401 of 1906.—H. MÜLLER: *Water Heating Apparatus for use in connexion with Stoves.*

This relates to boilers for use in connexion with stoves, and consists in the boiler being composed of a number of superimposed horizontal hollow elements in communication one with the others.

25,453 of 1906.—J. LAYFIELD and A. V. CRISP: *Metal-tied Cement Building Block.*

This relates to a cement or concrete building block, and consists in the combination with outer and inner wall members of cement or concrete of a bond connecting said members together, said bond comprising ties of thin sheet metal embedded in the cement of the wall members.

25,495 of 1906.—E. ZUBLIN: *Twisted Wire Ties for Connecting Iron Insertions in Armoured Concrete.*

This relates to twisted wire ties for connecting the iron rods to be inserted in armoured concrete made by twisting two or more wires together so that they form open forks at their ends, which forks after having received the iron rods, are closed by twisting the ends together.

28,853 of 1906.—S. H. LAW: *Adjustable Spring Sash Balance.*

This relates to a sash balance of the class wherein a spring drum is flexibly connected to a window sash, and consists in making said drum revolve about an arbor having a slot for the reception of

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

PATENTS.—*Continued on page* 461.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competition, iv.; Contracts, iv. vi. viii. x.; Public Appointments, xix.; Auction Sales, xxx.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bonâ-fide tender unless stated to the contrary

The date given at the commencement of each paragraph is the date when the tender, or the names of those willing to submit tenders, should be sent in.

*** It must be understood that the following paragraphs are printed as news, and not as advertisements: and that while every endeavour is made to ensure accuracy, we cannot be responsible for errors that *may* occur.

Contracts.

BUILDING.

APRIL 12. — **Lossiemouth.** — HALLS.—The mason, carpenter, slater, plumber, plaster, and painter works of new halls, to be erected at the High U.F. Church, Lossiemouth. The plans and specifications may be seen with Mr. John Wittet, architect, Elgin.

APRIL 12.—**Walsoken.**—SCHOOL ENLARGEMENT.—Norfolk Education Committee invite tenders for the enlargement and improvement of Walsoken (Norwich-road) School. Names not later than 12 noon on April 12 to Mr. T. M. Kerridge, architect, Club-chambers, Old Market, Wisbech. A deposit of 1*l.* 1s. will be required.

APRIL 13.—**Byker.**—CHURCH WORK.—Nave and chancel of the proposed church at St. Lawrence, Byker. Names to Messrs. Hicks & Charlewood, architects, 67, Westgate-road, Newcastle-on-Tyne.

APRIL 13.—**Glenlivet.**—BUILDINGS.—The mason, carpenter, and slater works of the following buildings, and for the plaster work of Nos. 5, 10, 11, and 12:—(1) Porch, etc., at Raws, Auchendoun; (2) repairs to byres, etc., at Tullochallum, ditto; (3) stable and byres at Croftbain, Glenlivet; (4) milkhouse at Lagual, ditto; (5) repairs to dwelling-house at Blairfindy, ditto; (5) stable, byre, and barn at Scalon, ditto; (7) byres and shed at Tomnalienan, ditto; (8) milkhouse at Mains of Quirn, ditto; (9) byres and shed at Ballenleish Strathavon; (10) dwelling-house at Inchnacape, ditto; (11) ditto at Dell, ditto; (12) ditto at Blairnamarrow, ditto; (13) barn at Campdalemore, ditto; (14) milkhouse at Rhinamaist, ditto; (15) byres and shed at Kirkton, Cabrach; (16) stable, byre, and shed at Torniechelt, ditto; (17) byre and men's room at Aldunie, ditto. Plans and specifications may be seen at the Gordon-Richmond Estate Office, Drumin, Glenlivet, or with Mr. A. Thomson, architect, Fife-Keith.

APRIL 15.—**Bishop Auckland.**—DETACHED VILLA.—The erection of a detached villa at Bishop Auckland, for Mr. F. Gray. Plans and specifications may be seen, and full particulars obtained, at offices of Mr. F. H. Livesay, architect and surveyor, 107, Newgate-street, Bishop Auckland.

APRIL 15.—**Bradford.**—JOINER'S WORK.—Joiner's work in connexion with Bradford Hospital Fund (Incorporated), Peel Park Galas, May 20 and 21, 1907. Plans, etc., can be seen, and quantities obtained, at the registered office, 17, Horton-lane, from 9 a.m. to 1 p.m.

APRIL 15.—**Charleville.**—ALTERATIONS TO HOUSE.—For alterations, additions, and improvements to Ballyhubbo House, Charleville, for Mr. Nicholas Fitzgerald, Fortlands, Charleville. Drawings and specification can be seen on application to Mr. Fitzgerald, or at the offices of Mr Brian E. F. Sheehy, architect, 57, George-street, Limerick.

APRIL 15.—**Partown.**—HOUSES.—The various works required in the erection of two dwelling-houses, Longwood-road. Name and address to Mr. James H. Hall, architect and surveyor, Fartown, Huddersfield.

APRIL 15.—**Ipswich.**—ALTERATIONS TO PUBLIC HALL.—Alterations to the Public Hall, Ipswich. Names to Messrs. Eade & Johns, architects, Tower-chambers, Tower-street, Ipswich. Applications must be accompanied by a deposit of 1*l.* 1s.

APRIL 15.—**Melincourt.**—HOUSES.—The Melincourt Building Club invite tenders for the erection of fifteen houses or more at Melincourt, Resolven. Plans and specifications to be seen at the Gored Hotel, Resolven, or at office of Mr. G. A. Treharne, engineer and architect, Belmont, Aberdare.

APRIL 15.—**Talybont.**—HOUSES.—The erection of a new minister's house and chapel house belonging to the Talybont C.M. Chapel. Plans and specifications may be seen at Blaenddol. (Mr. J. Berth Jones, architect, Colwyn Bay.)

APRIL 16.—**Cooperhill and Whitemire, N.B.**—COTTAGE, ETC.—For mason, joiner, slater, plumber, plaster, and painter works of:— (1) Double cottage at Cooperhill; (2) dwelling-house at Whitemire. Plans, etc., may be seen at Earlsmill.

APRIL 16.—**Menston.**—ASYLUM BLOCK.—The Menston Asylum Committee invite tenders for the whole of the works in connexion with a new chronic block, to be erected at this institution, to accommodate 120 cases. Plans may be seen, and bills of quantities obtained, on application to office of Mr. J. Vickers-Edwards, County Architect, County Hall, Wakefield. A deposit of 1*l.* is required. Cheques, etc., must be made payable and forwarded direct to the West Riding Treasurer, County Hall, Wakefield.

APRIL 16.—**Ripponden.**—ALTERATIONS, ETC., TO MILLS.—Alterations and additions to Ryburn Mills, Ripponden. Plans can be seen, and quantities obtained, at offices of Messrs. Richard Horsfall & Son, architects, 22*A*, Commercial-street, Halifax.

APRIL 16.—**Youghal.**—DINING HALL.—The Committee of Management of Youghal Auxiliary Asylum invite tenders for the erection of a dining hall and other works, according to plans, etc., which can be seen at the office of Messrs. W. H. Hill & Son, architects, 28, South Mall, Cork.

APRIL 17.—**Bradford.**—EXTENSION OF MILL.—The Bradford Corporation invite tenders for works of all trades required to be done in the extension of Dumb Mill, Frizinghall. Drawings and general conditions of contract may be seen, and bills of quantities obtained, on application to the City Architect, Whitaker-buildings, Brewery-street.

APRIL 17.—**Ellon.**—ALTERATIONS TO CHURCH.—The mason, carpenter, plasterer, and painter works of proposed alterations at Ellon Parish Church. The plans and conditions of contract may be seen with Messrs. Kelly & Nicol, architects, 367, Union-street, Aberdeen, from whom schedules of quantities may be obtained.

APRIL 17.—**Irlam.**—COUNCIL OFFICES.—The Irlam U.D.C. invite tenders for the erection of new Council Offices. Plans, specifications, and quantities may be seen at the Council Offices, Clarendon-terrace, Irlam. Deposit of 2*l.* 2s. to be made by intending contractors.

APRIL 17.—**Penshaw.**—HOUSES.—Tenders are invited by the Lambton Collieries, Ltd., for the building of forty workmen's houses at Waggon Hill, about five minutes' walk from Penshaw Station. Plans and specifications can be seen at the Company's Offices, Bunker Hill, Fence Houses.

APRIL 17. — **Portsmouth.** — URINALS, ETC.—Portsmouth Corporation invite tenders for the following works, viz.:—(1) To construct, etc., an eight-stall urinal and four trough closets for boys at the Victoria Park in the Borough of Portsmouth; (2) to construct, etc., a ladies' convenience and four trough closets for girls at the Victoria Park aforesaid. The specification, etc., may be seen, and a form of tender obtained for each of the above-mentioned works at the Borough Engineer's office at the Town Hall.

APRIL 17. — **Tipperary.** — PREMISES.—For building new premises and carrying out improvements in the existing concerns of Messrs. J. Millea & Co., Tipperary, where plans and specification may be inspected, or at the office of the architects, Messrs. W. H. Hill & Son, 28, South Mall, Cork.

APRIL 17.—**West Derby.**—ALTERATIONS, ETC.—The West Derby Guardians invite tenders for proposed alterations and additions to Isolation Ward, Belmont Classification House, from contractors having places of business and workshops within the Unions of West Derby, township of Toxteth Park, or the parish of Liverpool. A set of quantities can be obtained from Mr. Harris P. Cleaver, Clerk to the Guardians, Brougham-terrace, West Derby-road, Liverpool, on payment of 1*l.* 1s. Specification and drawings can be seen at the office of the architect, Mr. C. H. Lancaster, Brougham-terrace, West Derby-road.

APRIL 18.—**Scissett.**—ALTERATIONS, ETC., TO HOUSE.—The various works required in the erection of alterations and additions to Cuttlehurst House, Scissett. Drawings and specifications to be seen, and bills of quantities obtained, at offices of Messrs. John Kirk & Sons, architects, John William-street, Huddersfield.

APRIL 18. — **Stokesby.** — PRIMITIVE METHODIST CHURCH.—The erection of the Primitive Methodist Church, Stokesby. Plans, etc., can be inspected at The Manse, Acle, or at Mr. A. F. Scott's, architect and surveyor, 24, Castle Meadow, Norwich.

APRIL 19.—**Exeter.**—ALMSHOUSES, ETC.—New almshouses, remodelling existing cottages, and the restoration of the Chapel at St. Anne's, Exeter, for the Very Rev. the Dean and Chapter of Exeter. Plans and specifications at offices of Messrs. E. H. Harbottle & Son, architects, County Chambers, Exeter.

* APRIL 19. — **Portslade-by-Sea.** — NEW POLICE-STATION.—The East Sussex C.C. invite tenders for new police-station and police residences at Portslade-by-Sea. Further particulars can be seen on referring to an advertisement in this issue.

APRIL 20. — **Blaenavon.** — CLASSROOM.—Monmouthshire Education Committee invite tenders for the erection of a classroom and other works at the Hillside Council School, Blaenavon. Plans and specification may be seen at the C.C. Offices, Newport, Mon.

APRIL 20. — **Dearham.** — SCHOOL WORKS.—Cumberland Education Committee invite tenders for the whole of the works required to be done in the proposed alterations and additions to Dearham Council School. Drawings and specification may be seen at the office of the Clerk of Works, Mr. Joseph Forster, 13, Earl-street, Carlisle.

APRIL 20.—**Elland.**—ADDITIONS TO MILL.—The erection of an additional story to Norton Mill, Elland, for Mr. James Casson. Names and addresses, stating what portion of the works contractors desire to tender for, to Messrs. Stott & Sons, architects, 5, Cross-street, Manchester.

APRIL 20.—**Great Broughton.**—CHURCH.—Tenders (whole or part) are invited for the erection of a Primitive Methodist Church, at Great Broughton. Plans and specification can be seen at the house of the Rev. Mark Pattison, Ruskin Villa, Stokesley.

APRIL 20.—**New Inn, Pontypool.**—SCHOOL.—Monmouthshire Education Committee invite tenders for the erection of a new mixed school at New Inn, near Pontypool, in accordance with plans and specifications prepared by Mr. H. J. Griggs, A.R.I.B.A., architect, Newport. Plans and specifications may be seen, and bills of quantity obtained, upon application to Mr. C. Dauncey, Secretary, County Council Offices, Newport, Mon. A deposit of 2*l.* 2s. for a copy of the bill of quantities is to be made.

APRIL 20.—**Weston-super-Mare.**—GRAND STAND, ETC.—Tenders are invited for the erection of the grand stand, horse stalls, cattle and sheep pens, show and cart horse rings, band stand, pay boxes, etc., in connexion with the annual show, to be held on August 15, at Weston-super-Mare. Full particulars may be obtained from the Hon. Secretary, Mr. A. S. E. Sedgwick, 6, Magdala-buildings, Weston-super-Mare.

APRIL 22.—**Askam-in-Furness.**—MEETING-ROOM.—The erection of meeting-room in connexion with the Church of Christ, at Askam-in-Furness. Plans, specifications, and quantities on application to Messrs. J. W. Grundy & Son, architects, Central-buildings, Ulverston.

APRIL 22.—**Gamswell.**—ADDITIONS TO FARM BUILDINGS.—For additions to farm buildings, for Mr. R. Benson, Gamswell, where plans and specifications can be inspected.

APRIL 22.—**Hale.**—STABLES, ETC.—Hale U.D.C. invite tenders for the erection and completion of new stables, steam road roller shed, etc. Plans and specifications can be seen, and bills of quantities and form of tender obtained on the payment of a deposit of 1*l.* 1s., at the office of the Council's Surveyor, Mr. S. A. Pickering.

APRIL 22. — **Holyhead.**—PREMISES.—New premises for Holyhead Co-operative Society, Ltd. Plans and specifications can be seen at the Stores.

APRIL 22.—**Liskeard.**—RENOVATING CHAPEL.—The alterations and renovations of the Wesleyan Chapel, Liskeard. Plans and specification can be seen at office of Mr. John Sansom, F.R.I.B.A., architect, Liskeard.

APRIL 22.—**Pentre.**—HOUSE.—For the erection of minister's house at Pentre, for the Trustees of Nazareth Calvinistic Methodist Chapel, Pentre. Plans and specification may be seen at office of Mr. W. D. Morgan, M.S.A., architect, Post-office-chambers, Pentre, Rhondda.

* APRIL 23.—**Kennington.**—ADDITIONS TO OFFICES.—The Guardians of Lambeth invite tenders for additions to the Call-over Offices at Brook-street, Kennington, S.E. Drawings, etc., may be inspected between 10 and 5 on application. Tenders, endorsed "Tender for Call-over Office," and addressed to the Clerk, Guardians' Offices, Brook-street, Kennington, S.E., to be delivered on or before April 25.

APRIL 24.—**Clynnog.**—CHAPEL.—The erection of a new C.M. Chapel at Clynnog for the Ebenezer Chapel Committee. Plans, etc., to be seen at the Chapel House, also at the office of Mr. Watkin Williams Jones, architect and surveyor, Salem-place, Pwllheli.

APRIL 24.—**Cymmer.**—BAPTIST CHAPEL.—The erection of a new Baptist Chapel at Cymmer, near Port Talbot, for the Rev. E. K. Jones and Trustees. Plans and specifications may be seen with the Rev. E. K. Jones, 6, School-street, Cymmer, and quantities may be obtained from Messrs. Evans & Jones, architects and surveyors, 4, Trinity-place, Swansea, on deposit of 2*l.* 2s.

APRIL 24.—**Edinburgh.**—WASHHOUSES, ETC.—Edinburgh Corporation invite tenders for the various building works, as well as schemes and estimates for laundry engineering, in connexion with proposed Public Washhouses at Simon-square, for the St. Leonard's District. Plans, etc., may be seen, and schedules of quantities obtained, on personal application only, to Mr. R. Morham, City Architect, Public Works Office, City Chambers, Edinburgh.

APRIL 25.—**Hereford.**—INN.—The re-erection of the Red Lion Inn, Eign-street, Hereford, for the Stroud Brewery Company, Ltd., Stroud. Plans, etc., may be seen, and bills of quantities obtained, upon payment of a deposit of 2*l.* 2s.

APRIL 25. — **Walton.** — PUBLIC BATHS. — Liverpool Corporation invite tenders for the construction of Public Baths at Queen's-drive, Walton. Plans, etc., may be inspected, and quantities obtained, on application to the Engineer and Chief Superintendent (Mr. W. R. Court), at his office, Municipal Offices, Liverpool, on payment of 1*l.* 1s.

* APRIL 26.—**Chingford.**—SORTING OFFICE.—Commissioners of H.M. Works, etc., invite tenders for erection of a new sorting office at Chingford. Drawings, specifications, conditions, and form of contract can be seen on application to Mr. Wager, H.M. Office of Works. Bills of quantities and forms of tender obtainable as below. Tenders, endorsed "Tender for Chingford New Sorting Office," addressed to Secretary, H.M. Office of Works, Storey's-gate, S.W., before 12 o'clock noon, April 26.

APRIL 26.—**Machynlleth.**—DRILL HALL.—For the erection of a drill hall for the 5th V.B. South Wales Borderers at Machynlleth. Plans, etc., and all information may be obtained on written application to Mr. R. W. Davies, architect and surveyor, Dolafon, Carno.

APRIL 29. — **Wootton Bassett.**—RESIDENCE.—The erection of a private residence near Wootton Bassett Station. Plans, etc., may be seen at the offices of the architects, Messrs. Read & Osborne, Regent-circus, Swindon, and High-street, Wootton Bassett.

APRIL 30.—**Bellaghy.**—HOUSE.—For the erection of a Parochial House at Bellaghy, Co. Derry, for

the Rev. Peter M'Namee, P.P. Plans and specification may be seen at the Parochial House, Bellaghy, Castledawson, or at offices of Mr. J. V. Brennan, C.E., architect, Belfast Bank-chambers, Belfast.

MAY 1.—**Clonmel.**—HOSPITALS.—Clonmel District Lunatic Asylum Joint Committee of Management invite tenders for the erection of two consumptive hospitals. Plans and specifications and conditions of contract can be seen at the asylum. Duplicates can also be seen at the offices of Mr. J. F. Fuller, architect, 179, Great Brunswick-street, Dublin. Bills of quantities can be had on payment of 2*l.* 2s.

* MAY 3.—**London.**—ADMIRALTY EXTENSION.—Commissioners of H.M. Works, etc., invite tenders for Admiralty extension, Block IV. (superstructure). Drawing, specifications, copy of conditions, and form of contract, can be seen on application to Sir Aston Webb, 19, Queen Anne's-gate, S.W. Bills of quantities and form of tender obtainable at H.M. Office of Works. Tenders, addressed to the Secretary, H.M. Office of Works, Storey's-gate, S.W., and endorsed "Tender for Admiralty, Block IV.," to be delivered before 12 o'clock noon on May 3.

NO DATE. — **Allithwaite.** — HOUSE. — Tenders (separate trades) are invited for the erection of a house in Allithwaite, for Mr. John Thompson, jun. Plans may be seen, and quantities obtained, from the office of Messrs. Settle & Brundrit, A.R.I.B.A., Ulverston and Barrow-in-Furness.

NO DATE.—**Dipton.**—WORKMEN'S DWELLINGS.—The erection of sixteen workmen's dwellings at Dipton. Plans and specification may be seen at South Medomsley Colliery Office. Separate tenders required.

NO DATE.—**Hull.**—ADDITIONS, ETC., TO PREMISES.—For proposed additions and alterations to premises of the British Marble and Slate Syndicate, Neptune-street, Hessle-road, Hull. Plans may be seen, and quantities obtained, on application to Mr. Melville Lenham, architect, 21, Bond-street, Savile-street, Hull.

NO DATE.—**Nantwich.**—CHAPEL AND SCHOOLS.—The Primitive Methodist Trustees invite tenders for the erection of a new chapel and schools in Broad-lane, Nantwich. Bills of quantities and form of tender may be obtained from Mr. R. Matthews, architect, Parr's Bank-chambers, Nantwich, on payment of 1*l.* 1s.

NO DATE.—**S. Andrews.**—CHURCH WORK.—The Church of the Holy Trinity, S. Andrews For mason, joiner, plumber, slater, and glazier works. Schedules on 10s. deposit. Apply to Mr. P. Macgregor Chalmers, 95, Bath-street, Glasgow.

NO DATE. — **Thornbury.** — WORKS.—Erection of works, at Thornbury, for Shackleton's Tube Company, Ltd. Apply, by post only, to Mr. Parkinson, architect, Queensgate-chambers, Bradford, after receipt of which plans may be inspected.

NO DATE. — **Whitehead.**—POST-OFFICE.—For building of post-office premises on King's-road, Whitehead, Co. Antrim, for Mr. J. C. Montgomery. Plans and specifications can be obtained at office of Mr. Charles MacAllister, architect, Whitehall-buildings, 13, Ann-street, Belfast.

ENGINEERING, IRON, AND STEEL.

APRIL 15.—**Aberdeen.**—RELAYING TRAMWAY RAILS.—Aberdeen Corporation invite tenders for the relaying of the tramway rails in Albyn-place and Queen's-road, with the necessary concrete and paving works. Copies of the specification, schedule of quantities, and form of tender may be had on application at office of Mr. W. Dyack, Burgh Surveyor, Burgh Surveyor's Office, Aberdeen.

APRIL 15.—**Port Talbot.**—BRIDGE.—The U.D.C. of Margam invite tenders for proposed lattice girder footbridge at Tir Ynys, Port Talbot. Plans, etc., may be seen, and forms of tender obtained, by appointment with the Surveyor to the Council, Mr. John Cox, Port Talbot, on payment of a deposit of 1*l.* 1s.

APRIL 16. — **Clydach.** — BRIDGE WORKS.—The Glamorgan C.C. invite tenders for widening Coedgwilym Bridge, over the Swansea Canal on the Swansea and Pontardawe Main Road, near Clydach. Plans and specifications at the Clydach Police-station and at offices of Mr. W. E. R. Allen, Deputy Clerk of the C.C., Glamorgan C.C. Offices, Westgate-street, Cardiff.

APRIL 16. — **Rawmarsh.** — FENCING. — Rawmarsh U.D.C. invite tenders for supplying, delivering, painting, and fixing, at the Victoria Park, Rosehill, fencing. Full particulars may be obtained on application to the surveyor.

APRIL 16.—**St. Pancras.**—RAILWAY TRUCKS.—St. Pancras B.C. Highways Committee invite tenders for the provision of railway trucks for the disposal of house refuse. Particulars from the Borough Engineer at the Town Hall.

APRIL 18.—**London.**—PIPES, ETC.—The Great Indian Peninsula Railway Company invite tenders for the supply of the following stores, namely:—Copper pipes, locks, etc. Specifications and forms of tender may be obtained at office of Mr. J. I. Berry, Secretary, Company's Offices, 48, Copthall-avenue, London, E.C., on payment of the fee for the specification, which payment will not be returned.

APRIL 19.—**Woodville.**—SEWAGE SPRINKLER.—Hartshorne and Seals R.D.C. invite tenders for the supplying and fixing at the Woodville Sewage Farm one 30-ft. automatic revolving sewage sprinkler, also for one automatic measuring valve. Full particulars may be obtained from Mr. Arthur Lewis, Surveyor to the Council, Midway, near Burton-on-Trent.

APRIL 22. — **Glasslough.** — SIGNALLING. — Great Northern Railway Company (Ireland) Directors invite tenders for the providing and fixing of mechanical gates and wickets at their Glasslough Station, and also the reinterlocking of the existing interlocking frame in accordance with the plan to be seen at the office of Mr. W. H. Mills, Engineer-in-Chief, Amiens-street Terminus, Dublin.

APRIL 23. — **Reading.** — RAILING.—Reading Corporation invite tenders for the manufacture, supply, delivery, and erection on site complete of ironwork and fittings in connexion with about 1,900 yds. run of self-adjusting unclimbable railing. Drawings, etc., may be inspected, and form of tender, etc., obtained at the offices of the Borough Engineer and Surveyor, Town Hall, Reading.

APRIL 26.—**Trehafod.**—STEEL WORK FOR BRIDGE WIDENING.—Rhondda U.D.C. invite tenders for the supply, construction, etc., of the steel work in connexion with the widening, etc. of the Lower Eirw Bridge, Trehafod. Plans may be seen, and forms of tender obtained, at the office of the Engineer and Surveyor, Council Offices, Pentre, Rhondda, on payment of a sum of 1*l.* 1s.

APRIL 29.—**Durham.**—BRIDGE WORKS.—Tenders are invited for (*a*) widening Merrington-lane Bridge, Ferryhill, and Lanchester Low Bridge, (*b*) reconstructing Raby Beck Bridge, Staindrop, and Lanchester High Bridge in masonry and steel, and (*c*) painting the following County Bridges, viz.:—(1) Aldin Grange, (2) Cockenford, (3) Blackhall Mill, (4) Cockerton, (5) Eden Vale, (6) High Team (half), (7) Pensher, (8) Woodham Beck, (9) Daddryshield (Wear), (10) Daddryshield No. 2. (11) Ireshopeburn, (12) Killhope Mill, (13) Killhope Foot, (14) Low Team (half), (15) Nancy Pasture Foot, (16) Newton Cap, (17) Parkhouse Pasture, (18) Swalwell, (19) St. Helens Auckland, (20) Whitton, (21) Wolsingham, (22) Westgate, and (23) Wearhead. Plans and specifications may be seen, and bills of quantities and forms of tender obtained, at the County Engineer's Office, Shire Hall, Durham.

MAY 6. — **Todmorden.** — MACHINERY. — Todmorden Corporation invite tenders for the supply and erection of gas engines, sludge and sewage pumps, air compressor, sludge presses, sludge rams, lime mixer, mechanical screens, and accessories at the Sewage Disposal Works. Specification and drawings may be seen on application to Mr. J. A. Heap, Borough Engineer, Town Hall, Todmorden.

MAY 21. — **Copenhagen.** — BOILERS.—The Corporation of Copenhagen require tenders for the delivery of four water-tube boilers. Specifications and conditions of contract may be had on application to Elektrisk Station, Gothersgade 30, Copenhagen K, on payment of 30kr.

NO DATE. — **Bulwick.**—WIDENING BRIDGE.—Northamptonshire C.C. invite tenders for the widening of Bulwick Bridge, and raising the approach. Plans and specifications, etc., upon application to Mr. C. S. Morris, County Surveyor, County Hall, Northampton.

NO DATE.—**Leeds.**—IRON ROOFING.—Tenders invited by the Leeds Industrial Co-operative Society (Ltd.) (one contract only), for providing and fixing wrought-iron roofing, steel stanchions, girders, and cast-iron gutters, required for new laundry in course of erection in Gelderd-road, Leeds. (Mr. John W. Fawcett, Secretary, 10, Albion-street, Leeds.)

MISCELLANEOUS.

APRIL 13. — **Fishcarling Head.** — EMBANKMENT WORK.—For restoration of embankment from Fishcarling Head to a point near Halforth Farm. Apply to Messrs. Garlick & Sykes, civil engineers, 33, Winckley-square, Preston (deposit of 1*l.*).

APRIL 15.—**Billericay.**—CARTING, ETC.—Billericay R.D.C. invite tenders for carting materials, hire of horse, cart, harness, and man for occasional work, according to printed forms, which may be obtained of Mr. F. E. Ennals, Brentwood, or Mr. R. J. W. Layland, Billericay.

APRIL 15.—**Billericay.**—STEAM ROLLING.—Billericay R.D.C. invite tenders for steam road rolling up to March 31, 1908, according to printed forms, which may be obtained of Mr. F. E. Ennals, Brentwood, or Mr. R. J. W. Layland, Billericay.

APRIL 15.—**London.**—PAVING BLOCKS.—The Council of the Metropolitan Borough of St. Marylebone invite tenders for the supply and delivery of about 700,000 5 in. by 3 in. by 9 in. best Swedish yellow deal creosoted paving blacks. Forms of tender may be obtained on application at the Town Hall, and further particulars may be had of the Borough Surveyor, Mr. J. Paget Waddington, M.Inst.C.E.

APRIL 16.—**Pershore.**—HAULING.—Pershore R.D.C. invite tenders for stone hauling. Forms of tender specifying the approximate quantity, etc., may be obtained on application to Mr. C W. Hellier, the Surveyor, Wick, Pershore.

* APRIL 17.—**London.**—STABLES.—The Directors of the Midland Railway invite tenders for fitting up arches at Pancras-road, London, as stabling, etc. Plans and specifications may be seen, quantities, etc., obtained, from the Engineer's office, Derby Station, on and after April 12. Sealed tenders by post to the Secretary of Way and Works Committee, Midland Railway, Derby, not later than 9 a.m. on April 17.

APRIL 17. — **South Shields.** — GARDEN CHAIRS. — South Shields Corporation invite tenders for 100 garden chairs, of similar design and construction to those now in use at the Marine Park Bandstand enclosure. A sketch plan of the chair may be seen, and all other information obtained, at the office of Mr. S. E. Burgess, Borough Engineer and Surveyor, Chapter-row.

APRIL 18.—**Bognor.**—DUST CART.—Bognor U.D.C. invite tenders for the supply and delivery of three two-wheeled tip-up dust carts with iron covers for the removal of house refuse in their district. Specifications, forms of tender, and other particulars may be obtained from Mr. Oswald A. Bridges, Engineer and Surveyor to the Council.

APRIL 19.—**Bognor.**—SCAVENGING.—Bognor U.D.C. invite tenders for the collection of house refuse. Form of contract may be seen at the offices of the Council.

APRIL 19. — **Guildford.** — FURNISHING.—Guildford Guardians invite tenders for the furnishing, etc., of the house known as "River View," Woodbridge-road, Guildford. Particulars on application to Mr. W. J. Hill, at the Workhouse, Guildford.

APRIL 20. — **Pebworth.** — HAULING. — Pebworth R.D.C. invite tenders for hauling materials. Printed forms of tender and specification can be obtained on application to Mr. Edward Wadams, Clerk to the Council, Union Offices, Evesham.

APRIL 20. — **Windsor.**—CARTAGE.—Windsor R.D.C. invite tenders for the supply of horses and carts for day work in the Parish of Clewer Without. Forms of tender may be obtained on application to the Surveyor to the Council, Mr. William Menzies, Englefield Green, Surrey.

APRIL 20. — **Windsor.**—CARTAGE.—Windsor R.D.C. invite tenders for cartage of road materials from the Great Western Railway Station, Windsor, the railway stations at Datchet and Sunningdale, also from Ascot siding and Ascot Station, to the several roads in the district. Forms of tender may be obtained upon application to the Surveyor to the Council, Mr. William Menzies, Englefield Green, Surrey.

APRIL 22. — **Southgate.**—FIRE HYDRANTS.—Southgate U.D.C. invite tenders for the supply of 200 fire hydrants of the sluice valve pattern. Copies of the specification and forms of tender may be obtained on application to the Council's Surveyor, Mr. C. G. Lawson, C.E., on depositing 1*l.*

APRIL 22. — **Stanley.** — HOUSE REFUSE. — Stanley U.D.C. invite tenders for the removal of ashpit, privy, and general house refuse in their district. Conditions of tender, etc., may be seen on personal application to the Sanitary Inspector at the Council Offices, Stanley.

APRIL 25. — **Manchester.**—FIXING STOVES.—Manchester Corporation Gas Committee invite tenders for the fixing of gas cooking stoves. General conditions of contract, etc., can be obtained on application, in writing only, to Mr. Charles Nickson, Superintendent of the Gas Department.

APRIL 29.—**Oxendon.**—TAR CART.—Oxendon R.D.C. invite tenders for supplying a tar cart to hold 200 gallons. Particulars may be obtained from Mr. W. J. Smith, surveyor, Rothwell House, Coventry-road, Market Harborough.

* APRIL 30. — **Bromley.** — PANELLING, ETC. — The Bromley B.C. invite tenders for providing and fixing about 2,226 ft. super. of panelling in the new Municipal Buildings in Tweedy-road, Bromley, together with the necessary police-court furniture, in accordance with drawings, etc., prepared by Mr. R. F. Atkinson, architect, 8, Sackville-street, W. For further particulars please refer to an advertisement in this issue.

PAINTING, etc.

APRIL 16. — **Portsmouth.** — PAINTING, ETC.—Portsmouth Corporation invite tenders for painting, varnishing, etc., seats, railings, etc., on Southsea Beach, Southsea Common, the Canoe Lake Grounds, and the Pembroke Gardens. The specification may be seen and a form of tender obtained at the Borough Engineer's office at the Town Hall.

APRIL 22. — **Chesterfield.**—PAINTING.—Chesterfield Education Committee invite tenders for painting and colour washing the interior of St. Thomas's School, Brampton. Specification may be had from Mr. C. J. Kerslake, Secretary, Education Office.

APRIL 22. — **Chesterfield.**—PAINTING.—Chesterfield Education Committee invite tenders for painting the exterior of the Education Offices in Foljambe-road. Specification may be had from Mr. C. J. Kerslake, Secretary, Education Office.

APRIL 22. — **Chesterfield.**—PAINTING.—Chesterfield Education Committee invite tenders for painting the exterior of the Central School, Ashgate-road, and two caretakers' houses in Foljambe-road. Specification may be had from Mr. C. J. Kerslake, Secretary, Education Office.

APRIL 22.—**Halifax.**—PAINTING.—Halifax Improvement Committee invite tenders for painting work at Waterloo Villas. Specifications may be seen, and forms of tender obtained, on application to Mr. James Lord, M.Inst.C.E., Borough Engineer, Town Hall, Halifax, upon payment of the sum of 1*l.*

APRIL 23.—**Hastings.**—PAINTING.—Hastings Corporation invite tenders for painting the outside of the Priory-road Fire-station and cottage adjoining. Specification can be seen, and form of tender obtained, at the office of the Borough Engineer, Mr. P. H. Palmer, Esq., M.Inst.C.E., Town Hall, Hastings.

APRIL 25. — **Rainhill.** — PAINTING. — Lancaster Asylums Board Visiting Committee invite tenders for painting all external wood and ironwork at the annexe buildings, County Asylum, Rainhill, as well as of all other properties and buildings which are described in a specification, which may be seen on application to Mr. Jas. Gornall, Clerk and Steward. Clerk's Offices, Rainhill Asylum.

ROADS, SANITARY, AND WATER WORKS.

APRIL 15.—**Glasgow.**—SEWER.—Glasgow Corporation invite tenders for the work necessary in the construction of a 4-ft. sewer in the bed of Gads Burn, from end of present sewer in land of Millburn to culvert under canal. Specifications and forms of tender may be had on application at the office of Public Works, City Chambers, 64, Cochrane-street.

APRIL 15.—**Hull.**—NEW STREET.—For new street, on the Cottingham-road, for the Hull Estates Company, Ltd. Bills of quantities and other particulars can be obtained at offices of Messrs. Gelder & Kitchen, architects, Hull.

APRIL 15. — **Oakengates.** — SEWERAGE WORKS. — Oakengates U.D.C. invite tenders for the construction of sewers and other work connected therewith at Ketley Bank. The drawings may be seen, and copies of the specification, etc., may be obtained, at the offices of the engineers, Messrs. Berrington, Son, & Martin, Bank-buildings, Wolverhampton, upon payment of 2*l.* 2s.

APRIL 15.—**Paignton.**—SEWER, ETC.—The U.D.C. of Paignton invite tenders for extending a sewer, laying a water main, and making-up the roadway, etc., in Preston Down-road. The drawings, etc., may be seen, and information obtained, on application to Mr. C. Owen Baines, C.E., Surveyor to the Council, Town Hall.

APRIL 15.—**Porthcawl.**—ROAD WORKS.—Porthcawl U.D.C. invite tenders for the execution of works of private street improvement in the following streets, namely:—(1) Poplar-road, Porthcawl; (2) Quarry-lane, Porthcawl; (3) Houses-lane, Porthcawl; (4) Brogden-lane, Porthcawl. Plans and specification may be inspected, and forms of tender obtained, from Mr. R. W. Jones, the Council's Surveyor, on depositing the sum of 1*l.* 1s.

APRIL 15.—**Trefriw, Geirionydd.**—WATER-MAIN.—Geirionydd R.D.C. invite tenders for providing and laying about 1,339 yds. of 3-in. and 1,134 yds. of 4-in. cast-iron water-mains in the village of Trefriw,

Carnarvonshire, in accordance with plans and specification, which may be seen at Gwydyr Ucha, Llanrwst.

APRIL 15.—**Windermere.**—WIDENING ROAD.—Windermere U.D.C. invite tenders for widening and improving the main road to Patterdale, near Thickholme. Plans, etc., may be seen at the office of Mr. Charles E. Hines, Surveyor, Council Offices, Windermere.

APRIL 16.—**Caister.**—LAYING PIPES.—East and West Flegg R.D.C. invite tenders for laying a 12-in. cast-iron pipe at the outfall sewer on Caister Beach. Plans, etc., of the work required to be done may be seen at the office of Mr. A. F. Scott, F.S.I., engineer, 24, Castle Meadow, Norwich.

APRIL 16.—**Cymmer.**—CEMETERY.—Glyncorrwg U.D.C. invite tenders for the construction of cemetery at Cymmer (two contracts). Drawings and specification may be seen, and forms of tender obtained, upon application to the Surveyor's Department, Council Offices, Cymmer, upon depositing the sum of 1*l.* 1s. per contract.

APRIL 16.—**Pwllypant.**—ROAD WIDENING.—The Glamorgan C.C. is desirous of contracting for the following works, viz.:—(1) Widening and improving the Caerphilly and Quakers' Yard Main Road at Pwllypant; and (2) widening Coedgwilym Bridge, over the Swansea Canal, on the Swansea and Pontardawe Main Road, near Clydach. Plans and specification of work No. 1 may be seen, and copies of the bill of quantities obtained, at the Caerphilly Police-station, and of work No. 2 at the Clydach Police-station. The plans and documents for both works may be seen or obtained at offices of Mr. W. E. R. Allen, Deputy Clerk of the C.C., Glamorgan C.C. Offices, Westgate-street, Cardiff.

APRIL 17.—**Bassaleg.**—ROAD WORKS.—Monmouthshire C.C. main Roads and Bridges Committee invite tenders for altering and widening the Newport and Bedwas main road at Bassaleg. Plans and specification may be seen at the office of Mr. William Tanner, F.S.I., County Surveyor, and a copy of the quantities obtained on payment of 1*l.* 1s.

APRIL 17.—**Shirehampton.**—SEWER.—Bristol Sanitary and Improvement Committee invite tenders for the construction of a pipe sewer in Station-road, Shirehampton. The drawings may be seen at the offices of the City Engineer, and copies of the specifications, forms of tender, and bills of quantities may be obtained on payment of 1*l.*

APRIL 18.—**Aston Manor.**—DRAINAGE.—Aston Manor Public works Committee invite tenders for carrying out such private drainage works as may be required during the year ending March 31, 1908. Plans and specification may be seen, and schedule of prices and all particulars obtained, at offices of Mr. G. H. Jack, Borough Engineer and Surveyor, Council House, Aston Manor, upon payment of 1*l.* 1s.

APRIL 18.—**Cheadle.**—STREET WORKS.—Cheadle R.D.C. invite tenders for the making-up of Baddiley-street, Plant-street, Allen-street, Edward-street, and Young-street, Cheadle. Plans and specifications of the works can be seen at the Union Offices, Cheadle, between the hours of 10 a.m. and 5 p.m.

APRIL 18.—**Hackney.**—ROADMAKING.—Hackney B.C. invite tenders for the kerbing, channelling, paving, making-up, etc., of Trehurst-street (portion southward from Ashenden-road). The general conditions of contract and the specification and plans and sections may be inspected, and copies of the bill of quantities and form of tender obtained, on application to Mr. Norman Scorgie, M.Inst.C.E., Borough Engineer and Surveyor, and on payment of the sum of 1*l.* 1s.

APRIL 18.—**Penrhiwfer, etc.**—GAS MAINS.—Rhondda U.D.C. invite tenders for the laying of about 2,300 yds. of 3-in. gas mains at Penrhiwfer, Edmundstown, and Trebanog. Plan and specification may be seen, and form of tender supplied, upon application to Mr. Octavius Thomas, the Engineer and Manager, Gas and Water Offices, Pentre, Rhondda, upon depositing the sum of 1*l.* 1s.

APRIL 19.—**Kendal.**—SEPTIC TANKS, ETC.—Kendal Corporation invite tenders for the construction of septic tanks and grit and screening chambers, etc., at the Sewage Disposal Works. Drawings and specifications may be seen, and bills of quantities obtained, on application at the office of Mr. F. W. Oxberry, Borough Engineer and Surveyor, Town Hall, Kendal.

APRIL 20.—**Wick.**—SEWERS.—Estimates are wanted by the T.C. of Wick for:—(1) Supplying about 14,000 yards of fireclay sewerage pipes; (2) opening and refilling trenches for sewers and branch drains, supplying about 180 yards of cast-iron pipes, etc., putting in fireclay and iron pipes, and executing other relative works in Upper Pulteneytown. Drawings, etc., may be seen in the Town Clerk's Office, Wick, and in the office of Mr. James Fraser, C.E., Inverness, and schedules will be supplied to contractors by Mr. Fraser.

APRIL 22.—**Chorley.**—PAVING, ETC.—Chorley R.D.C. (Highways) invite tenders for paving, coating on macadam, etc., painting and lettering direction posts, etc., and for the materials for the year ending March 31, 1908. Further particulars and forms of tender may be obtained from Mr. Edward Lawrence, Highway Surveyor, Euxton near Chorley.

APRIL 22.—**Spennymoor.**—ROAD-MAKING.—The Spennymoor U.D.C. invite tenders for the road-making, sewering, etc., required in the making of back Flora-street, Cross-street A, and St. Paul's-street, Spennymoor. Plans, specifications, etc., may be seen, and forms of tender obtained, from Mr. C. R. Spencer, Surveyor to the Council, Spennymoor.

APRIL 23.—**Dartford.**—SEWER.—The U.D.C. of Dartford invite tenders for the construction of a sewer in Watling-street, about 1,750 yds. in length, in accordance with plan and specification, which may be seen, and quantities obtained, upon personal application at the office of the Surveyor, Mr. T. E. Tiffin, A.M.Inst.C.E., Council Offices, Dartford. A deposit of 2*l.* 2s. must be paid for the quantities.

APRIL 23.—**Deptford.**—PAVING.—Deptford B.C. invites tenders for making-up and paving the unpaved portion of Brindley-street, in accordance with the specification and plan, to be seen at the Borough Surveyor's Office, Town Hall, New Cross-road, S.E.

APRIL 23.—**Mountain Ash.**—ROAD WORKS.—The U.D.C. of Mountain Ash invite tenders for the construction of an approach road to the site of the proposed County School at Mountain Ash. Plans and specification may be seen, and forms of tender and bills of quantities obtained, at the offices of Mr. W. G. Thomas, the Council's Surveyor.

APRIL 23.—**Tottenham.**—ROAD WIDENING, ETC.—Tottenham U.D.C. invite tenders for (*a*) the diversion and culverting in of the "Moselle Brook" from the north-west corner of Tottenham Cemetery to Lordship-lane; (*b*) widening Green-lanes on the east side from Harringay Bridge to Stoke Newington boundary. The plans can be seen, and general conditions, etc., can be obtained on application to Mr. W. H. Prescott, A.M.Inst.C.E., Engineer to the Council, at their Offices, Council Buildings, The Green, Tottenham. The sum of 10s. 6d. will be charged for the quantities for each of the works.

* APRIL 23.—**West Ham.**—MAKING-UP STREETS.—The West Ham B.C. invite tenders for making-up certain streets. For particulars see advertisement in this issue. Plans may be seen, and specification, form of tender, etc., obtained, of the Borough Engineer. Tenders, endorsed "Tender for Private Street Works," to be sent by registered post to the Town Clerk, Town Hall, West Ham, E., not later than 4 o'clock, April 23.

APRIL 25.—**Romford.**—STREET WORKS.—Romford U.D.C. invite tenders for the following works, viz.:—Road repairs, etc., to Heath Park-road Salisbury-road, and Marlborough-road (portion of); laying of sewers, etc., in Nursery walk and Old-church-road. The plans may be seen, and specifications, quantities, and forms of tender obtained, on application to Mr. Herbert T. Ridge, at the Council Offices, Market-place, Romford, on deposit of 5*l.*

APRIL 26.—**Northwood.**—SEWER.—Ruislip-Northwood U.D.C. invite tenders for the construction of about 700 yds. of 9-in. stoneware pipe sewer. Plans and specification may be seen by appointment with Mr. W. Louis Carr, Surveyor, Council Offices, Northwood, Middlesex, from whom quantities may be obtained on payment of 1*l.* by cheque.

APRIL 27.—**Goodwick.**—DRAINAGE.—Haverfordwest R.D.C. invite tenders for the construction of about 2,300 lin. yds. of 12-in., 9-in., and 6-in. cast-iron and stoneware sewers, etc., in the parish of Llanwnda. Forms of tender and copies of specification may be obtained at the office of the Engineer, Mr. John Portsmouth, A.M.Inst.C.E., 12, Little College-street, Westminster, S.W., or at office of Mr. John E. H. Rogers, Clerk to the Council, 7, Dew-street, Haverfordwest, on payment of a deposit of 2*l.* 2s

APRIL 28.—**Hertford.**—STREET WORKS.—Hertford Corporation invite tenders for making-up the following private streets, viz.:—Tamworth-road (part of), Cross-road. The drawings and draft contract may be seen, and a copy of the specification, schedule of work, and form of tender obtained, at the office of the Borough Engineer, Mr. John Hy. Jevons, A.M.Inst.C.E., The Wash, Hertford, upon payment of 3*l.* 3s.

* APRIL 29.—**Portsmouth.**—ASPHALT PAVING.—The Portsmouth B.C. invite tenders for laying and maintaining compressed or block asphalt pavement. For particulars see advertisement in this issue. Form of tender, with schedule of prices attached to specification, to be sent under cover to the Town Clerk, Town Hall, Portsmouth, not later than 10 a.m., April 29.

MAY 1.—**Sheffield.**—SETTLING TANKS, ETC.—Sheffield Highway and Sewerage Committee invite tenders for the construction of six settling tanks (1,000,000 galls. each), twenty-four (half acre) contact beds (floors excepted), conduits and culverts, reconstruction of storm-water culvert, and other contingent works at the Sheffield Sewage Works, Wincobank, near Sheffield. Drawings may be inspected, and copies of the conditions of contract, etc., obtained, at the office of Mr. Charles F. Wike, City Surveyor, Town Hall, Sheffield, on payment of 2*l.*

MAY 3.—**Wetheral and Great Corby.**—SEWERAGE SCHEME.—Carlisle R.D.C. invite separate tenders or one whole tender for the construction of the following works, viz.:—Contract No. 1, about five miles of fireclay and iron sewers; contract No. 2, purification works, consisting of septic and collecting tank, contact beds, and other works. The works to be carried out in accordance with the plans, etc., prepared by Mr. Joseph Graham, civil engineer, Bank-street, Carlisle. Copies of the specifications and bills of quantities, with form of tender, can be obtained, and drawings inspected, at the office of the engineer upon payment of 5*l.* (cheque only).

STONE, MATERIALS, AND STORES.

APRIL 15.—**Billericay.**—ROAD MATERIAL.—Billericay R.D.C. invite tenders for the supply of Guernsey granite, Queenast granite, Kentish rag, flints, and gravel, up to March 31, 1908, according to forms of tender, which can be obtained of Mr. F. E. Ennals, Brentwood, or Mr. R. J. W. Layland, Billericay.

APRIL 15.—**Hastings.**—GRANITE, ETC.—Hastings Corporation invite tenders for 1,000 tons of broken granite or basalt suitable for road metal. Specification, form of tender, and other information may be obtained on application at the office of the Borough Engineer, Mr. P. H. Palmer, M.Inst.C.E., Town Hall, Hastings.

APRIL 15.—**Lepton.**—ROAD MATERIAL.—Lepton U.D.C. invite tenders for the supply of granite, dross, etc. Full particulars as to quantities and dimensions, with forms of tender, can be obtained from Mr. Joe Sharp, Clerk, Queen-street, Huddersfield.

APRIL 15.—**London.**—INGOTS.—The Bengal and North-Western Railway Company Directors invite tenders for the supply and delivery of copper ingots and tin ingots, as per specification to be seen at the Company's Offices. For each specification a fee of 10s. will be charged, which cannot, under any circumstances, be returned. (Mr. Alexander Izat, Managing Director, 237, Gresham House, Old Broad-street, London, E.C.)

APRIL 15.—**Wigan.**—STORES.—Wigan Gas Committee invite tenders for the supply of stores over the year ending on March 31, 1908. Forms of tender may be obtained from Mr. Jos. Timmins, M.Inst.C.E., Engineer, etc., Borough Gas Works.

APRIL 16.—**Haverhill.**—ROAD MACADAM.—Haverhill U.D.C. invite tenders at per ton for the following quantities of broken granite:—250 tons screened from 2 in. to 2½ in.; 250 tons screened from 1½ in. to 1⅝ in. (Mr. F. W. Knewstubb, A.M.Inst.C.E., Surveyor, Council Offices, Haverhill, Suffolk.

APRIL 16.—**Pershore.**—STONE.—Pershore R.D.C. invite tenders for the supply of stone. Forms of tender specifying the conditions, approximate quantity, and place of delivery may be obtained on application to Mr. C. W. Hellier, the Surveyor, Wick, Pershore.

APRIL 16.—**Rothwell.**—WATER PIPES.—Rothwell U.D.C. invite tenders for the supply of about 35 tons of 6-in. cast-iron water-main pipes, with necessary C.I. specials. Specifications and form of tender may be obtained on application to Mr. J. Southwart, Council Offices, Rothwell, near Leeds.

APRIL 17.—**Glasgow.**—MATERIALS AND WORKS.—The Corporation of Glasgow invite from tradesmen lists of prices at which they will undertake to do the undermentioned jobbing work and supply the following articles and materials during the year, from June 1 next to May 31, 1908, viz.:—(1) Painter work; (2) mason work; (3) plumber and gasfitter works; (4) ironmongery; (5) timber; (6) glass; (7) lime and cement; and (8) paints and oils, etc. Schedules and forms of offer may be obtained on application at the office of Mr W. C. Menzies, the Manager, 22, King-street, City.

APRIL 17.—**Leeds.**—PAINT, ETC.—Leeds Improvements Committee invite tenders for the supply of paint and painter's materials, required up to September 30, 1907. Forms of tender and schedules may be obtained from Mr. W. T. Lancashire, City Engineer, Municipal Buildings, Leeds, on payment of a deposit of 1*l.* 1s.

APRIL 17.—**Norden.**—FLAGS, SETTS, ETC.—Norden U.D.C. invite tenders for the supply of flags, setts, kerb, and macadam. Full particulars may be obtained on application to the Surveyor, Council Offices, Norden.

APRIL 18.—**Chelmsford.**—GRANITE AND LABOUR.—The T.C. invite tenders for granite and team labour. Further information may be obtained of Mr. Cuthbert Brown, A.M.Inst.C.E., Borough Surveyor, 16, London-road, Chelmsford.

APRIL 19.—**Hartshorne.**—GRANITE.—Hartshorne and Seals R.D.C. invite tenders for the supply of broken granite or limestone for the year ending March 31, 1908. Tenders to be sent to Mr. George Farmer, Clerk to the Council, Ashby-de-la-Zouch, marked "Tenders for Stone," together with samples of stone.

APRIL 19.—**Leeds.**—GRAVEL.—Leeds Corporation Waterworks Committee invite tenders for the supply of 11,360 tons of gravel, in four sizes, for filters. Specification and form of tender may be obtained, and samples of gravel seen, at the office of Mr. Chas. G. Henzell, M.Inst.C.E., Waterworks Engineer, Leeds.

APRIL 20.—**Greenock.**—FURNITURE.—Greenock and District Combination Hospital Board invite tenders for furniture for new Combination Hospital, presently in course of erection at Gateside, Inverkip-road, Greenock, according to specifications by Mr. Alexander Cullen, F.R.I.B.A., architect, Hamilton. Schedules of quantities and forms of tenders can be obtained on application to Mr. Colin MacCulloch, Clerk to the Board, Municipal-buildings, Greenock, on payment of a deposit of 5s. for each schedule.

APRIL 22.—**Dublin.**—STORES.—Dublin and South-Eastern Railway Directors invite tenders for the supply of stores for twelve months from May 1, 1907. Specifications, with form of tender, price 6d. each, can be had on application to Mr. M. F. Keogh, Secretary, Secretary's Office, Westland-row, Dublin.

APRIL 22.—**Manchester.**—CAST-IRON PIPES.—Manchester Corporation Waterworks Committee invite tenders for the supply of cast-iron hydraulic (high pressure) pipes. Particulars may be obtained on application to the Secretary, Waterworks Offices, Town Hall, Manchester, on payment of 10s.

APRIL 22.—**Manchester.**—STORES, ETC.—Manchester Corporation Waterworks Committee invite tenders for the supply of articles and materials. Particulars may be obtained on application to the Secretary, Waterworks Offices, Town Hall, Manchester.

APRIL 22.—**Northwood.**—MATERIALS, ETC.—Ruislip-Northwood U.D.C. invite tenders for the period up to March 31, 1908, for the provision of:—1,554 tons of broken granite; 1,223 tons of coarse gravel, etc. Forms of tender and full particulars may be obtained from Mr. W. Louis, Carr, Surveyor, Council Offices, Northwood, R.S.O., Middlesex.

APRIL 23.—**Samford.**—GRANITE.—Samford R.D.C. invite tenders for the supply of 500 tons 1½-in. broken granite. Mr. Arnold J. Haward, Clerk, 34, Princes-street, Ipswich.

APRIL 27.—**Thirsk.**—ROAD MATERIAL.—Thirsk R.D.C. invite tenders for the supply of about 2,000 tons of whinstone and 6,000 tons of slag. Form of tender can be obtained from Mr. William Swarbreck, Clerk to the said Council, Thirsk, or the Council's Surveyor (Mr. R. R. Wright) on receipt of a stamped addressed envelope.

APRIL 29.—**Ogmore.**—STONEWARE PIPES.—Ogmore and Garw U.D.C. invite tenders for the supply and delivery of stoneware pipes of various sizes and other stoneware goods for a term of twelve months. Further particulars and form of tender may be obtained on application at the Council's Offices, Bryn-menyn.

* APRIL 30.—**Bromley.**—ROAD MATERIALS.—The Bromley B.C. invite tenders for supply of various road materials (for particulars see advert. in this issue). Tenders, endorsed "Tender for Road Materials," to be delivered to the Town Clerk, Bromley, Kent, not later than 3 o'clock on April 30.

MAY 1.—**Clacton.**—MATERIALS.—Clacton U.D.C. invite tenders for stone, sand, etc. Copy specification and particulars can be obtained upon application to Mr. A. R. Robinson, the Surveyor to the Council, Town Hall, Clacton-on-Sea.

NO DATE.—**Ipswich.**—GRANITE AND FLINTS.—East Suffolk C.C. invite tenders for the supply of broken granite and flints. Particulars and forms of tender can be had on application to Mr. H. Miller, M.Inst.C.E., County Surveyor, 16, Museum-street, Ipswich.

Public Appointment.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*CLERK OF WORKS	Barnet U.D.C.	Not stated	April 16

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*BUILDING MATERIALS—At Nos. 439 and 441, Oxford-street, etc.	White, Berry, & Taylor	April 17
*BUILDER'S PLANT, ETC.—At Brief-street, Burton-road, Brixton, S.W.	Fuller, Horsey, Sons, & Cassell	April 18
*BUILDER'S AND CONTRACTORS' PLANT, ETC.—At Carrara Works, Vauxhall, S.E.	Elliott, Tombs, & Co.	do.
*100 FREEHOLD BUILDING PLOTS, MIDDLESEX—At the Swan Hotel, Whetstone	Brown & Ewin	April 22
*SAW-MILL MACHINERY, ETC.—At 145, Grosvenor-road, S.W.	Fuller, Horsey, Sons, & Cassell	April 23 & 24
*RESIDENTIAL PROPERTY, CHILD'S HILL—At the Mart	Furber	April 24
*FREEHOLD BUILDING ESTATE, EAST FINCHLEY—At the Mart	Farebrother, Ellis, Egerton, Breach, Galsworthy, & Co.	April 25
*103 AND 103A, OXFORD-STREET, W.—At the Mart	May & Rowden	April 26
*FREEHOLD BUILD. LAND, FRIERN BARNET—At the Torrington Arms Hotel, N. Finchley	Charles Sparrow & Son	April 29
*FREEHOLD BUILDING LAND, FINCHLEY—At the Torrington Arms Hotel, N. Finchley	Charles Sparrow & Son	do.
*FREEHOLD BUILDING ESTATE, SURREY—At the Mart	Fuller, Moon, & Fuller	do.
*FREEHOLD BUILDING LAND, TOOTING COMMON—At the Mart	Hampton & Sons	April 30
*FREEHOLD BUILDING SITE, HANWELL—At the Mart	C. Rawley, Cross, & Co.	do.
*FREEHOLD RIVERSIDE PROPERTY, NORTHFLEET—At the Mart	Edwin Fox & Bousfield	May 1
*FREEHOLD BUILDING SITE, CITY OF LONDON—At the Mart	Farebrother, Ellis, Egerton, Breach, Galsworthy, & Co.	May 14
*FREEHOLD BUILDING ESTATE, ELTHAM, KENT—At the Mart	Woods & Snelling	do.
*FREEHOLD BUILDING ESTATE, CLAPHAM COMMON—At the Mart	Thurgood & Martin	June 20

PATENTS.—*Continued from page 457.*

a suitable tool, whereby the spring may be tensioned after the same has been inserted in position.

1,202 of 1907.—M. S. NAPIER and S. F. EDGE. *Door Handles.*

This consists in the combination with a rotatable door handle having a hollow shank and a spindle secured therein of a plate fixed to the door and having a bearing sleeve projecting into the space between the shank and the spindle so that the sleeve is always in engagement with the shank.

2,327 of 1907.—A. GREENHALGH and T. FARRAR: *Flushing Tanks.*

This consists in the combination with a flushing tank mounted to rock on pivots or the like of a float valve controlling the water supply thereto, a siphon pipe having its bend normally above the water level in the tank, its short end near the bottom and its long end projecting through and below the bottom of the tank, a flush pipe with an enlarged mouth below the tank, and tilting means.

5,634 of 1906.—F. TRIER: *Machines for Sawing Stones and the like.*

This relates to machines for sawing stones and the like, and consists in the provision of troughs or their equivalents for catching and returning to the discs the abrading material which may be flung off in the process of cutting.

7,443 of 1906.—K. ZULKOWSKI: *Manufacture of Portland Cement.*

This relates to a process of manufacturing Portland cement in which a quantity of calcareous matter, such as limestone, quicklime, or other appropriate matter containing lime is used as required, for obtaining a desired degree of saturation of the final product, and is mixed with a molten and superheated flat furnace slag having a higher basic composition, with or without the addition of appropriate fluxes, the superheating and running being continued until perfect dissolution is obtained, the homogeneous mass being then tapped or drawn off and rapidly cooled.

19,233 of 1906.—F. KELLEN: *Artificial Stone.*

This relates to artificial stone consisting of stone chips such as marble, stone dust such as marble, magnesite, talc for making the ultimate material smooth and glossy, chloride of magnesium, silicate of soda, sulphuric acid for the drying and water with or without a colouring agent.

20,647 of 1906.—C. SCHOLTZ: *Conveyor Belt.*

This relates to conveyor belts, or bands, having the portions thereof coinciding with the points of transition from the central supporting rollers to the inclined guide rollers made more flexible than the remainder of the belt or band by means of parallel longitudinal strips of unevenly woven fabric, or fabric of unequal thickness inserted in the belt or by solids in the upper side of the belt.

20,901 of 1906.—J. HORNELL: *Composition used in the Manufacture of Artificial Marble, Stone, and the like.*

This relates to an artificial stone, marble, tile, brick, or the like made of broken, crushed, or pulverised shells of pearl-forming molluscs and coral incorporated with a suitable cement.

25,043 of 1906.—J. HENNINGS: *Manufacture of Artificial Slate.*

This relates to a process for the manufacture of artificial slate, and consists in intimately mixing and finely triturating 100 parts of cement with an addition of 20 to 25 parts of brown stone in dry condition, then mixing water to the pulverised material and forming a thin paste and introducing the same into glass moulds in which it is left to solidify in a slow and gradual manner.

20,907 of 1906.—J. H. DIERICKX: *Arrangement for locking Sliding Doors and the like.*

This relates to an arrangement to lock or hold sliding doors or the like in the open or closed position, consisting of a catch controlled by a spring and connected by a system of levers to the handle of the door, the said catch falling at the ends of the rolling track of the door into stop notches and thus holding the door either in the closed or in the open position.

21,000 of 1906.—T. DIBBLE: *Roofing Tile.*

This relates to a roofing tile provided with interlockable moulded edges, the shape being such that the outer face of the edge extends beyond the line of junction on the upper face of the tile and the covering extends inwards beyond the line of junction on the underface of the tile so as to prevent the tile being lifted in a direction at right angles to the upper and underfaces, the upper face of the tile having flat ribs and valleys to enter corresponding parts of the underface of the tile above it, ribs or other projections being provided to prevent the tiles slipping from the battens.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

March 26.—By J. C. PLATT (at Hammersmith).

Fulham,—39, Ellerby-st., u.t. 93 yrs., g.r. 7*l.*, y.r. 45*l.* £510
31, Doneraile-st., u.t. 91 yrs., g.r. 7*l.*, y.r. 45*l.* 530
37 and 39, Doneraile-st., u.t. 91 yrs., g.r. 14*l.*, y.r. 84*l.* 900

April 4.—By STAFFORD & ROGERS.

Rayleigh, Essex.—The Rayleigh Brick and Tile Works, together with plant and machinery, f., 21a. 0r. 13p. 2,350

By WORSFOLD & HAYWARD (at Dover).

Whitfield, Kent.—"Elvington Cottage" and "Belle Vue," f. 640
Ewell, Kent.—3 and 4, Dour-ter. and "Pear Tree Cottage," f. 550
Dover, Kent.—3, Swiss-cottages, f., y.r. 18*l.* .. 195
Upper Eythorne, Kent.—1 and 2, Elysian-villas, f., e.r. 22*l.* 330

April 5.—By LINNETT & LANE.

Harlesden.—23, Bruce-rd., u.t. 71 yrs., g.r. 7*l.*, y.r. 32*l.* 250
5, Manor-villas, u.t. 64 yrs., g.r. 5*l.*, e.r. 55*l* .. 650

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold, p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. beerhouse; p.h. for public-house; o. for office; s. for shops; ct. for court.

MEETINGS.

FRIDAY, APRIL 12.

Architectural Association.—Mr. J. A. Marshall on "Westminster Cathedral." 7.30 p.m.

Royal Institution.—Professor A. H. Church, M.A., on "Conservation of Historic Buildings and Frescoes," with Experimental Illustrations. 9 p.m.

Royal Sanitary Institute.—Mr. W. C. Tyndale on "House Drainage." 7 p.m.

Institution of Civil Engineers (Students' Meeting).—"An Engineer's Visit to Japan and Canada," by Mr. R. W. Allen, Assoc.M.Inst.C.E. 8 p.m.

Institution of Mechanical Engineers.—An Extra Meeting. The discussion will be continued on paper on "Petrol Motor-Omnibuses," by Mr. W. Worby Beaumont. 8 p.m.

SATURDAY, APRIL 13.

Architectural Association.—Spring visit to Lambeth Municipal Buildings, corner of Acre-lane and Brixton Hill. 2.30 p.m.

Royal Institution.—Professor Silvanus P. Thompson, B.A., on "Studies in Magnetism."—I. 3 p.m.

Royal Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection at the Sewage Works, Sutton. 3 p.m.

Northern Architectural Association.—A meeting at Sunderland. Arrangemen's have been for visiting the Wear Commissioners' new Offices (Architects, Messrs. Henderson & Hall), the new Police Building and Fire Station and the new Empire Music Hall (Architects, Messrs. W. & T. R. Milburn).

MONDAY, APRIL 15.

Royal Sanitary Institute.—Dr. A. Wellesley Harris on "Water Composition, Pollution, and Purification." 7 p.m.

TUESDAY, APRIL 16.

Royal Institution.—Professor G. H. Bryan, M.A., on "Wings and Aeroplanes."—II. 3 p.m.

Society of Arts (Applied Art Section.)—Mr. A. Romney Green on "Joinery and Furniture-making." Mr Halsey Ricardo will preside. 8 p.m.

Institution of Civil Engineers.—(1) Mr. Percy Allan on "The Pyrmont Bridge"; (2) Mr. W. H. B. Savile on "Swing Bridge over the River Avon at Bristol." 8 p.m.

WEDNESDAY, APRIL 17.

Royal Sanitary Institute.—Mr. J. E. Worth on "Water Supply, Sources of Supply, and Distribution." 7 p.m.; inspection at the East London Soapworks, Bow, at 3 p.m.

Edinburgh Architectural Association.—Associates' Business meeting.

Architectural Association Discussion Section.—Mr. A. O. Collard on "Payments and Responsibilities of Architects." 7.30 p.m.

British Archæological Association.—"Notes on Explorations at the North End of Lansdowne, Bath," with lantern, by Mr. T. S. Bush. 8 p.m.

Builders' Foremen and Clerks of Works' Institution.—Quarterly meeting of the members. 8 p.m.

Junior Institution of Engineers.—Visit at 6.30 p.m. to Messrs. Cassell & Co.'s Printing Works.

Society of Arts.—Major B. F. S. Baden-Powell on "Aerial Navigation." 8 p.m.

Institution of Civil Engineers.—Students' Visit to the works of the British Oxygen Company, Ltd., Elverton-street, Westminster, S.W.

THURSDAY, APRIL 18.

Royal Institution.—Professor H. A. Miers, M.A., D.Sc., on "The Birth and Affinities of Crystals."—II. 3 p.m.

Institution of Electrical Engineers.—Mr. A. Schwartz on "Flexibles, with Notes on the Testing of Rubber." 8 p.m.

FRIDAY, APRIL 19.

Royal Sanitary Institute.—Mr. J. E. Worth on "Sewerage." 7 p.m.

SATURDAY, APRIL 20.

Royal Institution.—Professor Silvanus P. Thompson on "Studies in Magnetism.—II. 3 p.m.

Royal Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection at Morden Hall Dairy Farm, Morden, Surrey. 3 p.m.

Edinburgh Architectural Association.—Visit to Bangour village.

TERMS OF SUBSCRIPTION.

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PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.	
Hard Stocks	1 8 0	per 1000 alongside, in river.
Bough Stocks and Grizzles	1 6 0	„ „ „
Picked Stocks for Facings	2 10 0	„ delivered.
Flettons	1 8 0	„ at railway depôt.
Red Wire Cuts	1 14 0	„ „ „
Best Fareham Red	3 12 0	„ „ „
Best Red Pressed Ruabon Facing	5 0 0	„ „ „
Best Blue Pressed Staffordshire	3 15 0	„ „ „
Do. Bullnose	4 0 0	„ „ „
Best Stourbridge Fire Bricks	3 14 0	„ „ „

GLAZED BRICKS.

Best White and Ivory Glazed Stretchers	12 0 0	„ „ „
Headers	11 0 0	„ „ „
Quoins, Bullnose, and Flats	16 0 0	„ „ „
Double Stretchers	19 0 0	„ „ „
Double Headers	16 0 0	„ „ „
One Side and two Ends	19 0 0	„ „ „
Two Sides and one End	20 0 0	„ „ „
Splays, Chamferred, Squints	20 0 0	„ „ „
Best Dipped Salt Glazed Stretchers, and Header	12 0 0	„ „ „
Quoins, Bullnose, and Flats	14 0 0	„ „ „
Double Stretchers	15 0 0	„ „ „
Double Headers	14 0 0	„ „ „
One Side and two Ends	15 0 0	„ „ „
Two Sides and one End	15 0 0	„ „ „
Splays, Chamferred, Squints	14 0 0	„ „ „
Second Quality White and Dipped Salt Glazed	2 0 0	„ less than best.

	s. d.	
Thames and Pit Sand	7 0	per yard, delivered
Thames Ballast	5 6	„ „
Best Portland Cement	28 0	per ton, „
Best Ground Blue Lias Lime	19 0	„ „

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 11s. 6d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

STONE.

	s. d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1 6½	per ft. cube
Do. do. delivered on road waggons, Nine Elms Depôt	1 8½	„ „
PORTLAND STONE (20 ft. average)—Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 1	„ „
White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 2½	„ „

	s. d.	
Ancaster in blocks	1 10	per ft. cube, deld. rly. depôt
Beer „	1 6	„ „
Greenshill „	1 10	„ „
Darley Dale in blocks	2 4	„ „
Red Corsehill „	2 2	„ „
Closeburn Red Freestone	2 0	„ „
Red Mansfield „	2 4	„ „

YORK STONE—*Robin Hood Quality.*

Scappled random blocks	2 10	„ „
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3	per ft. super., „
6 in. rubbed two sides ditto, ditto	2 6	„ „
3 in. sawn two sides slabs (random sizes)	0 11½	„ „
2 in. to 2½ in. sawn one side slabs (random sizes)	0 7½	„ „
1½ in. to 2 in. ditto, ditto	0 6	„ „

HARD YORK—

Scappled random blocks	3 0	per ft. cube, „
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 8	per ft. super. „
6 in. rubbed two sides ditto	3 0	„ „
3 in. sawn two sides slabs (random sizes)	1 2	„ „
2 in. self-faced random flags	0 5	„ „

SLATES.

In. In.	£ s. d.	
20×10 best blue Bangor	13 2 6	per 1000 of 1200 at r. d.
20×12 „ „	13 17 6	„ „
30×10 first quality „	13 0 0	„ „
20×12 „ „	13 15 0	„ „
16×8 „ „	7 5 0	„
20×10 best blue Portmadoc	12 12 6	„ „
16×8 „ „	6 12 6	„ „
20×10 best Eureka unfading green	15 17 6	„ „
20×12 „ „	18 7 6	„ „
18×10 „ „	13 5 0	„ „
16×8 „ „	10 5 0	„ „

SLATES (*continued*).

In. In.	£ s. d.	
20×10 permanent green	11 12 6	per 1000 of 1200 at r. d.
18×10 „ „	9 12 6	„ „
16×8 „ „	6 12 6	„ „

TILES.

	s. d.	
Best plain red roofing tiles	42 0	per 1000 at rly. depôt.
Hip and Valley tiles	3 7	per doz. „
Best Broseley tiles	50 0	per 1000 „
Do. Ornamental tiles	52 6	„ „
Hip and Valley tiles	4 0	per doz. „
Best Ruabon red, brown, or brindled do. (Edwards)	57 6	„
Do. Ornamental do.	60 0	„
Hip tiles	4 0	per doz. „
Valley tiles	3 0	„ „
Best Red or Mottled Staffordshire do. (Peakes)	51 9	per 1000 „
Do. Ornamental do.	54 6	„ „
Hip tiles	4 1	per doz. „
Valley tiles	3 8	„ „
Best "Rosemary" brand plain tiles	48 0	per 1000 „
Best Ornamental tiles	50 0	„ „
Hip tiles	4 0	per doz. „
Valley tiles	3 8	„ „
Best "Hartshill" brand plain tiles, sand-faced	50 0	per 1000 „
Do. pressed	47 6	„ „
Do. Ornamental do.	50 0	„ „
Hip tiles	4 0	per doz. „
Valley tiles	3 6	„ „

WOOD.

BUILDING WOOD.	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	13 10 0	... 15 0 0
Deals: best 3 by 9	13 0 0	... 14 0 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11 0 0	... 12 0 0
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best.
Battens: seconds	0 10 0	„ „
2 in. by 4 in. and 2 in. by 6 in.	9 0 0	... 10 0 0
2 in. by 4½ in. and 2 in. by 5 in.	8 10 0	... 9 10 0
Foreign Sawn Boards—		
1 in. and 1¼ in. by 7 in.	0 10 0	more than battens.
¾ in.	1 0 0	„

	At per load of 50 ft.	
Fir timber: best middling Danzig or Memel (average specification)	4 10 0	... 5 0 0
Seconds	4 0 0	... 4 10 0
Small timber (8 in. to 10 in.)	3 12 6	... 3 15 0
Small timber (6 in. to 8 in.)	3 0 0	... 3 10 0
Swedish balks	2 10 0	... 3 0 0
Pitch-pine timber (30 ft. average)	4 0 0	... 4 15 0

JOINERS' WOOD.	At per standard.	
White Sea: first yellow deals, 3 in. by 11 in.	24 0 0	... 25 0 0
3 in. by 9 in.	22 0 0	... 23 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	... 18 0 0
Second yellow deals, 3 in. by 1 in.	18 10 0	... 20 0 0
„ „ 3 in. by 9 in.	17 10 0	... 19 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	... 14 10 0
Third yellow deals, 3 in. by 11 in. and 9 in.	13 10 0	... 15 0 0
Battens, 2½ in. and 3 in. by 7 in.	11 0 0	... 12 0 0
Petersburg first yellow deals, 3 in. by 11 in.	21 0 0	... 22 10 0
Do. 3 in. by 9 in.	18 0 0	... 19 10 0
Battens	13 10 0	... 15 0 0
Second yellow deals, 3 in. by 11 in.	16 0 0	... 17 0 0
Do. 3 in. by 9 in.	14 10 0	... 16 0 0
Battens	11 0 0	... 12 10 0
Third yellow deals, 3 in. by 11 in.	13 0 0	... 14 0 0
Do. 3 in. by 9 in.	12 10 0	... 14 0 0
Battens	10 0 0	... 11 0 0
White Sea and Petersburg—		
First white deals, 3 in. by 11 in.	14 10 0	... 15 10 0
„ „ 3 in. by 9 in.	13 10 0	... 14 10 0
Battens	11 0 0	... 12 0 0
Second white deals, 3 in. by 11 in.	13 10 0	... 14 10 0
„ „ 3 in. by 9 in.	12 10 0	... 13 10 0
„ „ battens	10 0 0	... 11 0 0
Pitch-pine: deals	18 0 0	... 21 0 0
Under 2 in. thick extra	0 10 0	... 1 0 0
Yellow Pine—First, regular sizes	44 0 0	upwards.
Oddments	32 0 0	„
Seconds, regular sizes	33 0 0	„
Yellow Pine oddments	28 0 0	„
Kauri Pine—Planks, per ft. cube	0 3 6	... 0 5 0
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 3 0	... 0 3 6
Small „ „	0 2 6	... 0 2 9
Wainscot Oak Logs, per ft. cube	0 5 6	... 0 6 0
Dry Wainscot Oak, per ft. sup. as inch	0 0 8½	... 0 0 9½
¾ in. do. do	0 0 7	... —
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0 0 9	... 0 0
Selected, Figury, per ft. super. as inch	0 1 6	... 0 2 6
Dry Walnut, American, per ft. super. as inch	0 0 10	... 0 1 0
Teak, per load	17 0 0	... 22 0 0
American Whitewood Planks, per ft. cube	0 4 0	... 0 5 0

Prepared Flooring, etc.—	Per square.	
1 in. by 7 in. yellow, planed and shot	0 13 6	... 0 17 6
1 in. by 7 in. yellow, planed and matched	0 14 0	... 0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 16 0	... 1 0 0
1 in. by 7 in. white, planed and shot	0 12 0	... 0 14 6
1 in. by 7 in. white, planed and matched	0 12 6	... 0 15 0
1¼ in. by 7 in. white, planed and matched	0 15	... 0 16 6

WOOD (*continued*).

JOINERS' WOOD—(*continued*).

Prepared Flooring, etc. (*continued*)—	Per square. £ s. d.	£ s. d.
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0	... 0 13 0
1 in. by 7 in. „ „	0 14 0	... 0 18 0
¾ in. by 7 in. white „ „	0 10 0	... 0 11 6
1 in. by 7 in. „ „	0 12 9	... 0 15 0

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	7 7 6	... 7 15 0
Compound Girders, ordinary sections	9 10 0	... 10 10 0
Steel Compound Stanchions	12 5 0	... 13 5 0
Angles, Tees, and Channels, ordinary sections	9 5 0	... 10 5 0
Flitch Plates	9 5 0	... 10 5 0
Cast Iron Columns and Stanchions including ordinary patterns	8 0 0	... 9 0 0

METALS.

IRON—	Per ton, in London. £ s. d.	£ s. d.
Common Bars	8 10 0	... 9 0 0
Staffordshire Crown Bars, good merchant quality	9 5 0	... 9 15 0
Staffordshire "Marked Bars"	11 0 0	... —
Mild Steel Bars	9 10 0	... 9 15 0
Hoop Iron, basis price	9 15 0	... 10 0 0
„ „ Galvanised	17 10 0	... —

(*And upwards, according to size and gauge.)

Sheet Iron Black—		
Ordinary sizes to 20 g.	10 0 0	... —
„ „ 24 g.	11 0 0	... —
„ „ 26 g.	12 10 0	... —
Sheet Iron, Galvanised, flat, ordinary quality—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	16 0 0	... —
Ordinary sizes to 22 g. and 24 g.	16 10 0	... —
„ „ 26 g.	17 0 0	... —
Sheet Iron, Galvanised, flat, best quality—		
Ordinary sizes to 20 g.	19 0 0	... —
„ „ 22 g. and 24 g.	19 10 0	... —
„ „ 26 g.	21 0 0	... —
Galvanised Corrugated Sheets—		
Ordinary sizes 6 ft. to 8 ft. 20 g.	16 0 0	... —
„ „ 22 g. and 24 g.	16 5 0	... —
„ „ 26 g.	17 10 0	... —
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	13 0 0	... —
Best Soft Steel Sheets, 22 g. & 24 g.	14 0 0	... —
„ „ „ 26 g.	16 0 0	... —
Cut Nails, 3 in. to 6 in.	10 15 0	... 11 5 0

(Under 3 in., usual trade extras.)

LEAD, &c.

	Per ton, in London. £ s. d.	£ s. d.
LEAD—Sheet, English, 3lb. and up.	22 17 6	... —
Pipe in coils	23 7 6	... —
Soil pipe	25 7 6	... —
Compo pipe	26 7 6	... —
ZINC—Sheet—		
Vieille Montagne ton	34 5 0	... —
Silesian	34 0 0	... —
COPPER—		
Strong Sheet per lb.	0 1 4	... —
Thin „ „	0 1 5	... —
Copper nails „	0 1 3	... —
BRASS—		
Strong Sheet „	0 1 2	... —
Thin „ „	0 1 3	... —
TIN—English Ingots „	0 1 11	... —
SOLDER—Plumbers' „	0 0 9	... —
Tinmen's „	0 0 11	... —
Blowpipe „	0 1 1	... —

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

15 oz. thirds	2½d. per ft. delivered.
„ fourths	1¾d. „ „
21 oz. thirds	3½d. „ „
„ fourths	2½d. „ „
26 oz. thirds	4½d. „ „
„ fourths	3½d. „ „
32 oz. thirds	5d. „ „
„ fourths	4½d. „ „
Fluted Sheet, 15 oz.	3½d. „ „
„ 21 oz.	4½d. „ „

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

⅛ Hartley's	2½d. per ft. delivered.
¼ „	2½d. „ „
½ „	3d. „ „
Figured and Oxford Rolled	
"Oceanic" Glass, white 4d.	„ „
Do. „ tinted 5½d.	„ „

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes	per gallon	0 1 11
„ „ „ in barrels	„	0 2 0
„ „ „ in drums	„	0 2 2
Boiled „ „ in pipes	„	0 2 1
„ „ „ in barrels	„	0 2 2
„ „ „ in drums	„	0 2 4
Turpentine in barrels	„	0 4 4
„ in drums	„	0 4 7
Genuine Ground English White Lead	per ton	26 0 0
Red Lead, Dry	„	24 10 0
Best Linseed Oil Putty	per cwt.	0 7 0
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0

VARNISHES, &c. (*continued*).	Per gallon. £ s. d.
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 10 0

TO CORRESPONDENTS

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

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Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

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All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ARMAGH.—For alterations to corridors (male side), for the Committee of the Asylum. Mr. R. H. Dorman, County Surveyor, Armagh:—

A. C. Simpson	£345	D. P. Martin & Co., Armagh*	£335

BANGOR.—For the erection of a manse on the Maxwell-road for the Committee of the First Bangor Presbyterian Church. Mr. Ernest L. Woods, architect, Bangor, Co. Down:—

H. Keith	£1,730 0	L. Irving	£1,448 0
Calwell	1,690 0	Colville & Watson	1,390 0
E. Beers	1,512 10	T. McKee, Belfast*	1,200 0

BARNSTAPLE.—For constructing a sewer at Georgeham, for the Rural District Council. Mr. E. G. Kingwell, Surveyor, 85, Boutport-street, Barnstaple:—

W. Somerwill	£161 13	R. Brown, Georgeham*	£132 0
Tucker Bros.	150 0		

BELHELVIE.—For erecting a new farmhouse at Middleton, for the trustees of the late Mr. Thomas Clapperton, of Potterton. Messrs. Watt & Davidson, architects, 216, Union-street, Aberdeen:—

Mason: G. Duncan, Inverurie* £106 12 6
Carpenter and Painter: Edward & Rae, Dyce* 119 19 0
Slater and Plumber: C. McDonald & Sons, Dyce* 35 16 0
Plaster: Roger & Baxtor, Aberdeen* 40 17 0

BEWCASTLE.—For erecting a bridge at the Crook, for Longtown Rural District Council. Mr. J. Murray, Surveyor, Kirklinton, Carlisle. Quantities by Surveyor:—
J. Scott & Sons, Newcastleton, N.B..... £172 1

BISHOP'S STORTFORD.—For constructing new filter-beds at sewage farm, for the Urban District Council. Mr. R. S. Scott, Surveyor, 7, North-street, Bishop's Stortford:—
J. Day, South-street, Bishop's Stortford*.. £245

BLACKBURN.—For alterations and extensions for new out-patients' department, etc., for Blackburn and East Lancashire Infirmary. Messrs. Simpson & Duckworth, architects, Richmond-terrace, Blackburn:—
W. J. Woof, Cronshaw, & Sons, Pump-street, Blackburn £4,031 10

BURNLEY.—For County Court, for H.M. Office of Works:—

	Tender for Works.	Allowance for old Materials.
Kelshaw & Lee	£6 580 0 0	£10
R. Brown & Sons	6,395 0 0	20?
Clegg Bros.	6,383 19 6	20
W. A. Peters & Sons	6,325 0 0	50
Smith Bros. (Burnley), Ltd.	6,114 0 0	—
B. Lumb	6,050 0 0	30

CWMDU.—For new Council school, Cwmdu. Mr. W. D. Jenkins, M.R.San.I., County Education Architect:—

Thomas Bros.	£998 0	R. Thomas	£745 0
E. Evans	868 0	E. H. Williams	740 0
W. Davies	825 0	W. Thomas, Llandilo*	689 0
D. Howells & Son	812 10		

DUNDALK.—For erecting a sanitary convenience, gate piers, etc., at Town Hall, for the Urban District Council. Mr. Sellars, Town Surveyor, Dundalk:—
J. Wynne, Dundalk* £260

FELIXSTOWE.—For erecting a residence, for Mr. C. Stebbing. Mr. H. W. Buxton, architect, Victoria-chambers, The Parade, Felixstowe. Quantities by Messrs. Young & Brown, 104, High Holborn, London:—

Kirk & Randall	£2,779	Patman & Fotheringham, Ltd.	£2,552
F. Bennett	2,690	W. Lawrence & Son	2,544
W. Johnson & Co., Ltd.	2,664	J. Smith & Son	2,525
G. E. Wallis & Sons	2,660	H. J. Linzell	2,417
S. A. Kenney	2,648	T. C. Thurman	2,394
C. Wall, Ltd.	2,610	T. Ward & Son, Felixstowe*	2,337
R. W. Pratt	2,593		
Grimwood & Sons, Ltd.	2,579		

GARDEN CITY (Herts).—For the erection of five shops and offices (including shop-fronts) at Leys-avenue, Garden City, for Mr. J. M. Easton. Messrs. W. B. Stonebridge & W. A. Foll, architects, Woburn Sands, Beds:—

Bickley & Turpie	£4,565	Foster	£3,080
Raban & Sons	3,650	Redhouse	2,776
Sinfield	3,380	Hurst‡	2,594

‡ Withdrawn.

GRIMSBY.—For erecting new works at South Kellingholme, for Grimsby Fish, Manure, and Oil Co. Messrs. Bentley & Hall, architects, 1, Pelham-chambers, Old Market-place, Grimsby. Quantities by architect:—

W. Pattinson & Sons, Ltd.	£5,973 0 0
Hewins & Goodhand	5,897 0 0
W. Moss & Sons, Ltd.	5,836 16 8
H. Marrows	5,765 0 0
Quibell, Son, & Greenwood, Ltd.	5,707 0 0
J. H. Thompson & Sons, Grimsby*	5,600 0 0
H. W. Parker & Son	5,430 10 0

HULL.—For private street improvement works, Victoria-avenue, etc., for the Corporation. Mr. A. E. White, M.Inst.C.E., City Engineer, Town Hall, Hull:—

J. Whitelam, Finsbury-street, Hull*	£774 17 8	Victoria-avenue.
	465 18 4	Richmond-street.

KETTERING.—For the supply of valves and penstocks at sewage works, for the Urban District Council. Mr T. R. Smith, Surveyor, Market-place, Kettering:—

	For the Construction of Sewage Disposal Works, comprising Septic Tanks Filters and other Works, rebuilding Cottages, etc.		For construction of Gas-st. Sewer, etc.
Firth & Co.	£8,054 4 1	....	£648 16 4
G. Bell & Sons	8,041 19 6	....	—
J. H. MacDonald	7,740 5 4	....	525 0 0
Smith, Edmunds, & Co.	6,903 0 0	....	528 0 0
G. Henson	6,802 0 0	....	436 13 9
A. Jewell	6,547 5 4	....	543 7 0
W. Moss & Sons	6 524 12 4	....	725 0 0
W. Cunliffe	6 295 0 0	....	—
O. P. Drever	6,137 17 3	....	471 8 11
W. G. Wilmott	6,044 8 0	....	483 15 11
Kettering Co-operative Builders, Ltd.*	5,452 12 0	....	396 10 10

Cast-iron Pipes.

Cochrane & Co. (Woodside), Ltd.	£371 13 7
J. Needham & Sons	366 15 6
Clay Cross Iron Co.	355 9 10
J. Oakes & Co.	348 12 9
Stanton Ironworks Co., Ltd.	343 1 6
Holwell Iron Co., Ltd.	340 12 2
Butterley Co., Ltd., Derby*	332 6 2

Valves and Penstocks.

Glenfield & Kennedy, Ltd.	£230 9 0
Whitehead & Poole	217 12 6
J. Stone & Co., Ltd.	216 6 9
Adams-Hydraulics, Ltd.	199 0 0
G. Waller & Son	171 7 9
F. Bird & Co.	160 14 6
J. Blakeborough & Sons	157 16 0
J. Rees & Sons	154 12 6
Parsons & Wills	147 19 3
Ham, Baker, & Co., Ltd, Westminster, S.W.*	139 2 0

KINGSTON-ON-THAMES.—For enlargement of head post-office:—

	£	Cr.
W. H. Farley	6,212	11
T. J. Nichols	5,137	20
W. H. Glaze & Sons	5,095	11
C. Oldridge & Sons	5,093	20
F. & H. F. Higgs	4,994	20
Patman and Fotheringham, Ltd.	4,993	20
H. Flint	4,967	67
W. E. Blake	4,890	10
J. Parsons	4,857	35
McC. E. Fitt	4,855	167
Hyde & Co.	4,764	34
W. H. Lorden & Son	4,687	35
F. G. Lawrence	4,725	39
J. Dorey & Co., Ltd.	4,580	19
E. J. Clayton	4,568	20
F. & J. Foster	4,486	36
Wisdom Bros.	4,272	79

KIRKBURTON.—For sewerage and sewage disposal works for the Urban District Council. Messrs. Brook, Dransfield, & Dyson, Engineers, Estate-buildings, Huddersfield. Quantities by Engineers:—

R. C. Brebner & Co.	£8,922 17 7	E. Eagland & Sons	£6,288 0 0
W. Underwood	8,020 9 7	Edmundson & Wyatt	6,270 0 0
J. H. Macdonald	7,886 0 0	J. Bentley	6,183 13 5
J. H. Tyler	7,387 0 0	W. Doleman	6,115 6 4
Kellets, Ltd.	7,329 17 11	H. H. Barry	6,022 0 0
S. Johnson & Son	6,827 11 6	Ward & Tetley	5,968 3 5
H. Smith	6,706 0 0	Sidebottom & Brown	5,791 6 7
M. Arundel	6,640 4 8	J. Balmforth	5,721 8 2
A. Braithwaite & Co.	6,553 0 3	G. H. & N. W. Graham	5,644 0 0
Etheridge & Clarke	6,527 5 7	S. Graham	5,606 0 0
R. Turner	6,423 10 2	Bentley & Swift	5,577 13 5
R. Naylor & Son	6,297 17 11	W. Waring & Sons, Huddersfield*	5,565 0 0

LANDRAKE.—For 197 yds. of sewerage pipes, for St. Germans Rural District Council. Mr. J. A. Andrews, Surveyor, Southill, Saltash:—
W. Stephens, Milbrook £67 15

LEEK.—For additions to Isolation Hospital, Ashborn-road, for the Urban District Council. Mr. W. E. Beacham, C.E., Surveyor, Town Hall, Leek. Quantities by the Surveyor:—
T. Grace, Leek* £1,806 19 4

LEICESTER.—For extension to warehouse, for Messrs. T. H. Downing & Co. Messrs. Tait & Herbert, architects, Leicester and Coventry:—
For Constructional Steelwork.

		Weeks.
Potter & Sons	£985 0 0	26
Needham & Lowe	904 4 2	—
Russell & Sons	867 18 8	16
E. Wood & Co., Manchester*	857 0 0	13
Gimson & Co.	834 13 2	17

LONDON.—For gasfitter's work, London District, for H.M. Office of Works and Public Buildings:—

—	Addition to Schedule Prices—Percentage.	Deduction from Schedule Prices—Percentage.	Addition to Wages—Percentage.
Tilley Bros.	—	1½	10
Stubbs, Son, & Hall	10	—	10
Cannon & Hefford	5	—	10
J. C. Christie	7½	—	10
J. Johnson	5	—	10
S. Pontifex & Co.	10	—	20
Lonsdale Engineering Co., Ltd.	10	—	12½
W. G. Cannon & Sons, Ltd.	12½	—	12½
Beaven & Sons, Ltd.	12½	—	7½
J. Defries & Sons, Ltd.	16½	—	6
T. S. Knight & Sons	20	—	10
T. & F. Mays	20	—	10
G. F. Benkert	22½	—	35
Wentworth & Co.	25	—	25
Comyn, Ching, & Co., Ltd.	25	—	6½
W. E. Bone	25	—	10
F. Franklin	45	—	40
A. T. Gardner	200	—	20

LONDON.—For granolithic paving at the Sick Asylum, Devons-road, Bromley-by-Bow, for Poplar and Stepney Sick Asylum District Managers. Messrs. J. & W. Clarkson, Architects, 136, High-street, Poplar, and Great Ormond-street, W.:—

W. Peters	£97 17 6	P. Fitzpatrick & Co.	£67 11 0
W. A. Telling (Britannic Stone Co.)	90 0 0	Malcolm, Macleod, & Co.	67 0 0
Patent Imperious Stone Co.	80 17 0	W. Cook	66 0 0
Imperial Stone Co., Ltd.	79 0 0	Stuart's Granolithic Co.	65 0 0
F. Bradford & Co.	77 2 0	A. Walker & Son, Ltd.	63 0 0
J. Sheenan	72 0 0	E. Tatham & Co., Ltd.	61 15 0
British Fireproof Construction Co.	68 15 0	W. B. Wilkinson & Co., Fulham*	60 10 0
Atlas Stone Co., Ltd.	68 10 0		

NEWPORT.—For erecting business premises, High-street, for Dr. A. Garrod Thomas, D.L., J.P. Mr. A. Swash, F.R.I.B.A., Midland Bank Chambers, Newport. Quantities by architect:—

E. G. Clarke	£2,496	R. Moon	£2,245
W. Blackburn	2,490	E. C. Jordan	2,238
W. A. Linton	2,480	C. H. Reed	2,198
J. Jenkins, Ltd.	2,480	J. H. Williams	2,148
J. Matthias	2,448	J. Charles	2,099
W. E. Blake	2,350	J. Dean & Son, Newport*	2,025
E. F. King & Co.	2,310		
D. Parfitt	2,280		

NORTH COLLINGHAM.—For drainage works, for Newark Rural District Council. Mr. R. Oakden, jun., Surveyor, 17, Winchilsea-avenue, Newark:—

G. K. Waghorn	£213 0	C. Baines	£168 0
J. Lane	189 10	W. Smith	154 0
J. Margerson & Co.	179 0	W. Mills, Collingham*	130 0
Keetch & Wayner	178 6		

OVENDEN.—For erecting Lee Mount Baptist Chapel. Mr. Abm. Sharp, architect, Pearl Assurance-buildings, 19, Market-street, Bradford:—

Masons: Jones & Wilcock, Queensbury
Joiners: Fielding & Bottomley, South-parade, Halifax
Plumbers, Glaziers, and Heating Apparatus: Aykroyd Bros., Cullingworth
Ironfounders and Steel-work: J. Berry, New Bank, Halifax
Plasterers and Concretors: Rushworth & Frith, New Bank, Halifax
Slater: J. Smithies, Great Horton, Bradford
Painters: J. Spencer & Sons, Haley-hill, Halifax
} £4,000

OXFORD.—For erecting a grand stand in Magdalen School meadow, for the Oxford Historical Pageant Committee. Mr. F. P. Trepess, F.I.A.S., architect, Warwick. Quantities by architect:—

J. Harrison & Co.	£2,382	T. H. Kinjerlee & Sons	£1,949
W. H. Grigg	2,244	N. E. Minty	1,825
J. Wooldridge	2,231	Saunders & Sons, Ltd., Cirencester*	1,255
W. A. Holden & Co.	2,145		
W. Rice & Sons	1,968		
Organ Bros.	1,955		

ROCHESTER.—For additions to esplanade pier, for the Corporation. Mr. W. Banks, City Surveyor, Guildhall, Rochester:—

Chalkey & Co.	£376 17	West Bros., Rochester*	£349 17 6

SANDBACH.—For erecting a slaughter-house, for the Industrial Co-operative Society, Ltd. Messrs. A. Price & Son, architects, Elworth, Sandbach. Quantities by architects:—

Birchall Bros.	£779 0	G. Millward	£632 14
J. Stringer, Sandbach*	674 0	G. Edwards	634 10
W. Street	639 17	S. Jackson, Ltd.	626 9

SOUTHALL.—For making up seven roads, for Southall-Norwood Urban District Council. Mr. R. Brown, Engineer and Surveyor:—

—	Beverley-road.	Alexandra-av.	Florence-road.	Hambro-road.	Hammond-road.	Hammond-road East, part of.	Ludd-road.
	£	£	£	£	£	£	£
J. E. Etheridge	302	657	790	1,578	1,131	383	526
Free & Sons	347	749	921	1,728	1,303	449	597
S. Gibbons	314	634	806	1,508	1,155	392	534
A. & B. Hanson	320	690	800	1,578	1,135	385	540
Hardy, Bate, & Co.	339	696	852	1,629	1,212	444	577
F. Hoffman	341	716	897	1,709	1,414	434	579
E. Iles Junr.	350	748	906	1,730	1,268	459	589
H. Morecroft	323	684	827	1,590	1,191	408	550
Mowlem, Ltd.	324	689	843	1,610	1,198	413	558
F. G. Porter*	287	618	747	1,449	1,067	363	490
G. Rutter	323	690	845	1,613	1,219	410	546
T. Watson, jun.	335	674	861	1,570	1,220	425	535
W. Wheeler	359	741	905	1,640	1,208	467	587
T. Wood & Sons	342	726	886	1,685	1,248	432	581
Engineer's estimate	290	638	763	1,478	1,101	378	506

[Total of accepted Tenders for the seven roads, £5,021. Total estimate for same, £5,154.]

SOUTHFLEET.—For constructing a covered reservoir, for the Metropolitan Water Board. Mr. W. B. Bryan, M.Inst.C.E. Quantities by Messrs. J. Rider Hunt & Co.:—

E. Nuttall & Co.	£8,321	10	2
W. Pattinson & Sons, Ltd.	6,677	0	0
J. Byrom, Ltd.	6,103	6	8
B. E. Nightingale	5,555	0	0
T. Docwra & Sons	5,458	16	3
A. Fasey & Son	5,374	3	4
J. Aird & Sons	5,289	14	7
J. Mowlem & Co., Ltd.	5,172	0	0
S. Redhouse, sen.	5,111	11	4
T. Smart	4,882	0	0
J. Ellingham & Sons	4,858	9	0
A. E. Nunn	4,837	2	3
W. Muirhead & Co.	4,799	19	11
J. A. Ewart	£4,741	12	4
J. Moran & Son, Ltd.	4,659	17	3
G. E. Wallis & Sons, Ltd.	4,630	0	0
Kirk & Randall	4,604	0	0
Scott & Branton	4,546	0	0
F. Miskin, Ltd.	4,524	0	0
W. Moss & Sons, Ltd.	4,484	0	0
W. Underwood & Brother	4,414	1	9
W. F. Blay	4,342	0	0
A. G. Osenton	4,242	15	0
R. H. B. Neal, Ltd.	4,162	7	1
C. Wall, Ltd.	4,097	14	0
G. Bell & Sons, Ltd., Tottenham*	4,042	18	1

SOUTHWICK.—For making up of William-street, Fishersgate, for the Urban District Council. Mr. G. W. Warr, Surveyor, Town Hall, Southwick. Quantities by Surveyor:—

J. Whittington	£203	14	0
Woolgar Bros.	175	6	10
T. Peters	170	15	0
W. H. Holman & Co.	£163	15	11
E. H. King, Tarring-road, Worthing*	141	9	5

SWANSEA.—For widening Neath-road, Landore, and constructing boundary-walls, for the Town Council. Mr. G. Bell, A.M.I.C.E. Quantities by Borough Surveyor:—

D. Jenkins & Co.	£693	0	
Bennett Bros.	656	0	
J. Stevens	490	0	
J. & F. Weaver	£470	0	
J. Marles & Son	455	0	
Walters & Johns*	454	10	

[All of Swansea.]

TAUNTON.—For erecting cottage over and in the rear of the Fire Brigade Station, Magdalene-street, for the Town Council. Mr. D. Edwards, Borough Surveyor, Municipal-buildings, Taunton:—

Manning & Son	£259	0	0
H. G. Smith	257	0	0
F. Small	243	13	0
E. G. Coles	£229	10	0
T. H. Moggridge*	227	0	0

[All of Taunton.]

TAUNTON.—For widening Kingston-road, for the Town Council. Mr. D. Edwards, A.M.Inst.C.E., Borough Surveyor, Municipal-buildings, Taunton:—

G. Pollard & Co.	£257	3	0
F. Small	238	5	0
J. Y. Coles*	£234	3	9

[All of Taunton. Surveyor's estimate, £230.]

TONBRIDGE.—For erection of pair of semi-detached villas in Quarry-lane, for Mr. F. G. P. Neve. Mr. E. C. Harris, P.A.S.I., architect and surveyor, 5, Hornsey Rise-gardens, N:—

Strange & Sons	£2,235	K. C. Jarvis	£2,030
Punnett & Sons	2,048	Martin & Co.*	1,992

[All of Tonbridge.]

TWYNRODYN, MERTHYR.—For erecting fifty houses and for the construction of two streets, for Merthyr Tydfil Town Council. Mr. T. Fletcher Harvey, C.E., Borough Engineer:—

W. H. Brown, Bethesda-street, Merthyr* £7,050 5 8

WALSALL.—For erecting a brick chimney stack, 130 ft. high, at the electricity generating station, Wolverhampton-street, for the Corporation:—

H. Gough & Son, Wolverhampton* £575

WRANGLE (Lincs.).—For additions, alterations, and repairs to the Wesleyan Chapel, and for reseating chapel. Mr. J. Bowell, Architect and Surveyor, Church-lane, Boston:—

T. H. Cade	£399	0	
W. Greenfield	369	0	
F. L. Shaw	357	0	
J. T. Turner & Sons	349	10	
C. Jessop	348	0	
A. Wood	£345	0	
J. Richardson & Son	329	10	
J. H. Woods	328	0	
J. Comer, Boston*	321	10	

GREAT YARMOUTH.—We are asked to state that in the two lists of tenders for mantle showrooms, workrooms, bootroom, and men's offices, for "Palmers," which appeared in our last issue, Mr. A. S. Hewitt, Bank-chambers, Regent-street, Great Yarmouth, should have been given as one of the architects. The omission was not ours.

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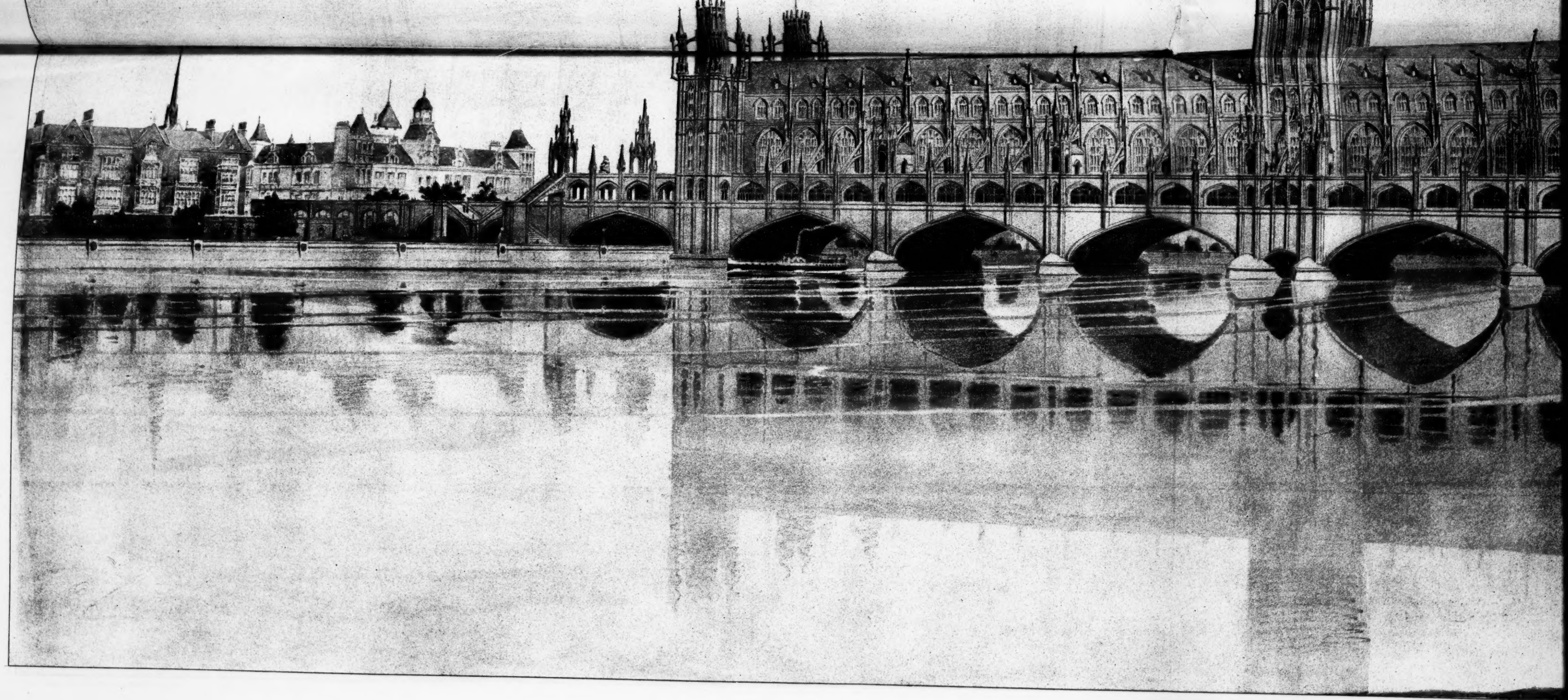
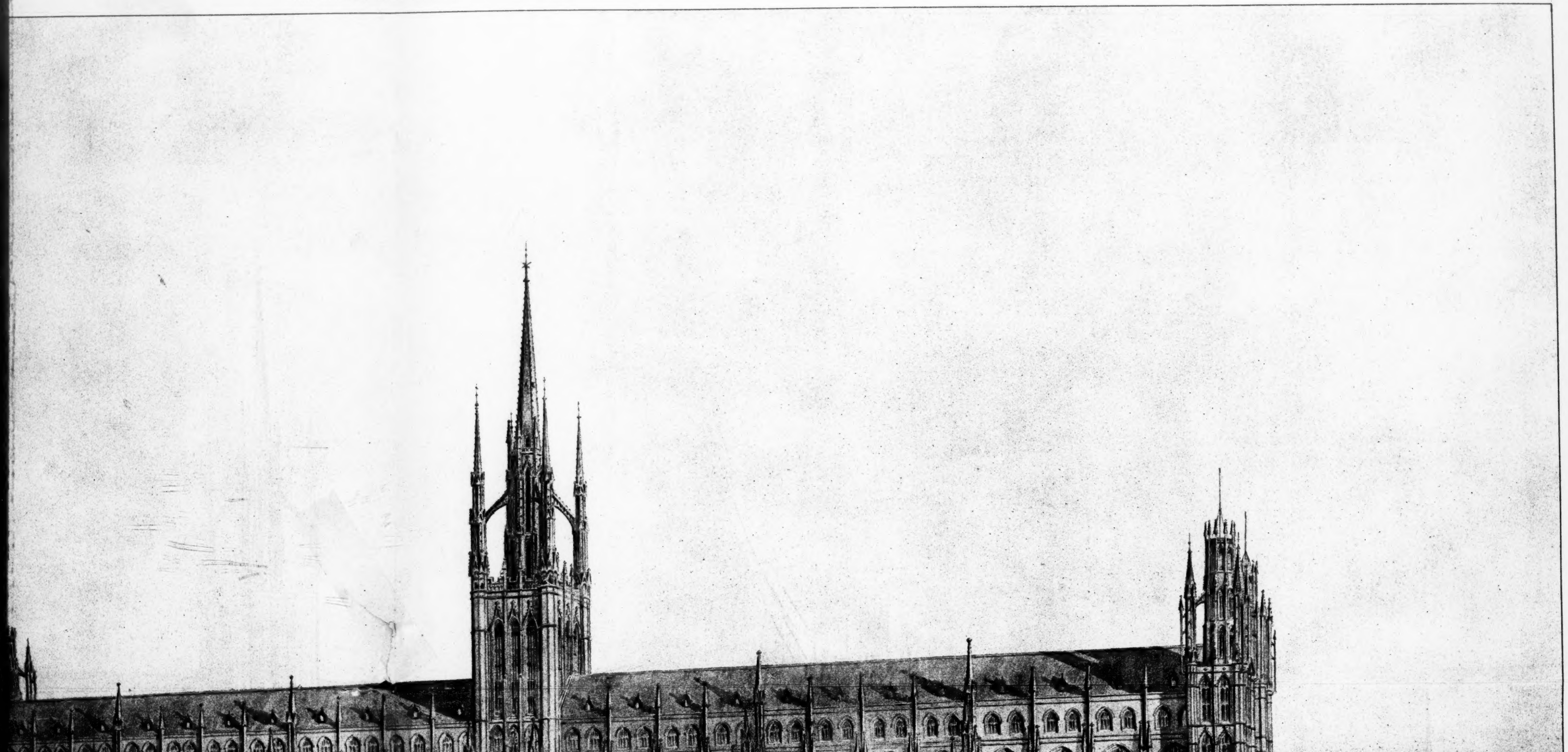


PROPOSAL FOR A COUNTY HALL AND BRIDGE OVER THE RIVER THAMES.

By Mr. Ernest W. Twining.



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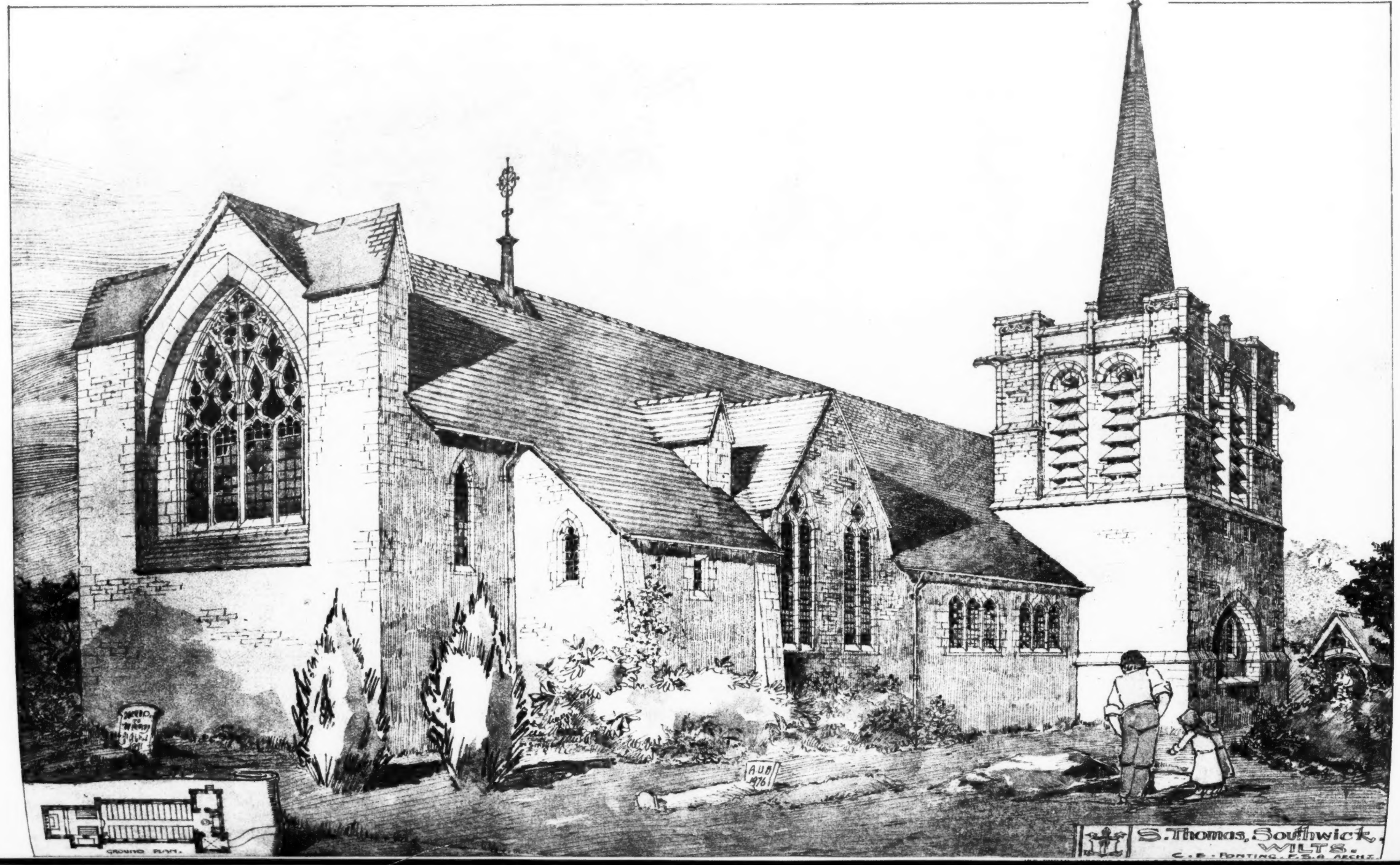
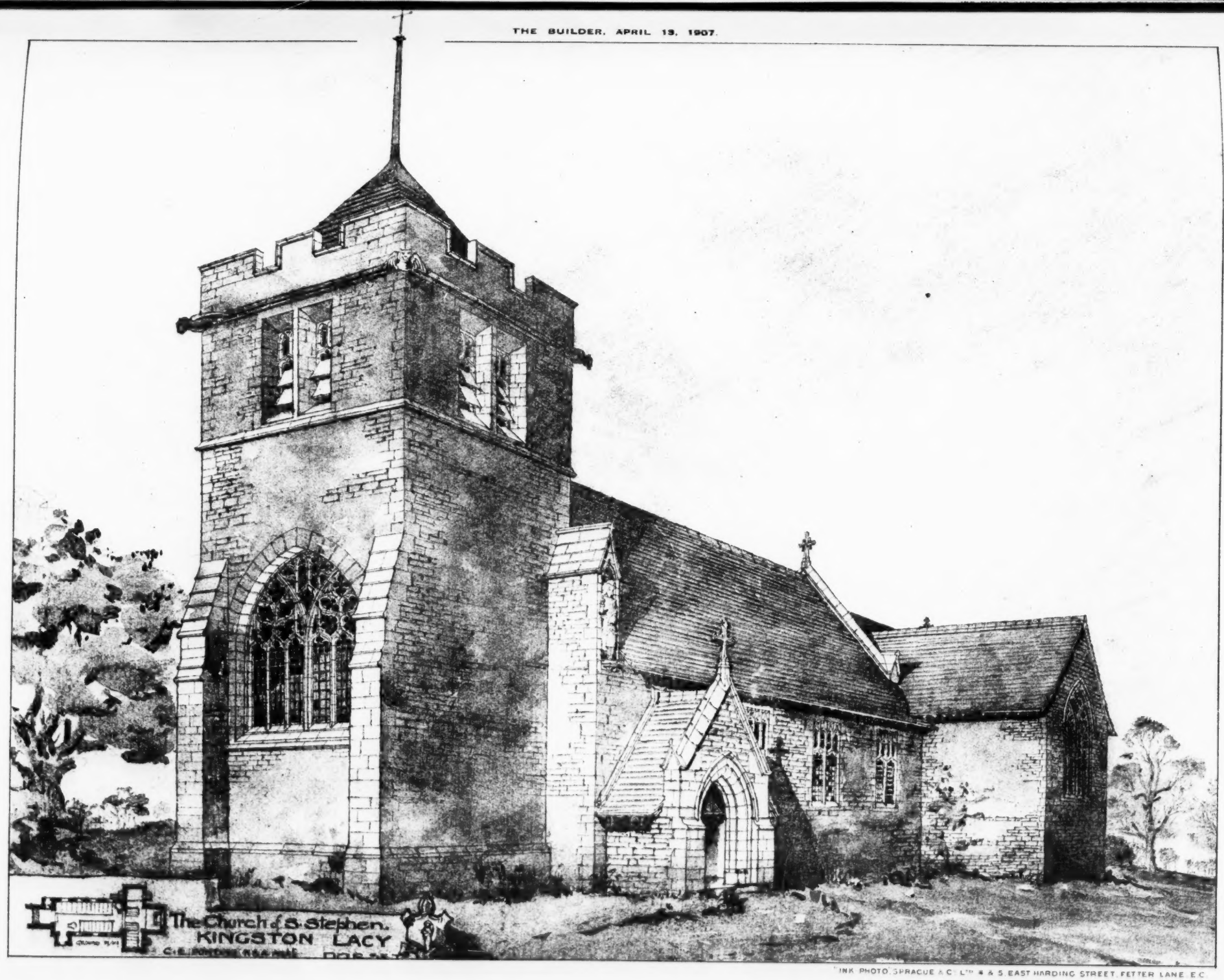

GROUND PLAN.
S. Thomas, Southwick, WILTS.
C. E. Ponting, F.S.A. Archt.



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